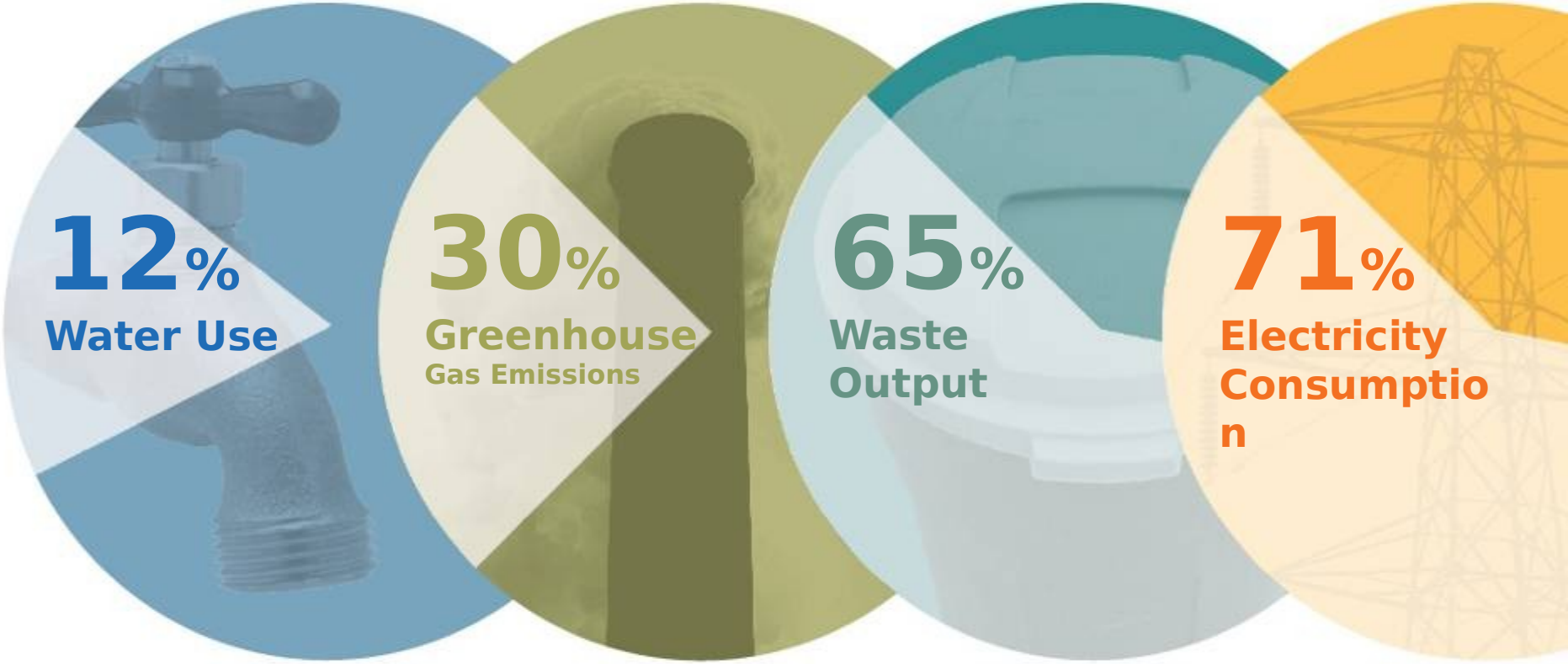
The LEED-NC Credits

Appendix A of USACE LEED Implementation Guide contains credit-by credit commentary including Army preferences and Installation support roles

U.S. Building Impacts:



LEED-NC Categories

- Sustainable Sites 14 pts
- Water Efficiency 5 pts
- Energy and Atmosphere 17 pts
- Materials and Resources 13 pts
- Indoor Environmental Quality 15 pts
- Innovation & Design Process 5 pts

Prerequisites (7ea): must always do, no points for it.
Credits and Points: some credits are worth one point, other credits have multiple possible points within the credit.
Total score is number of points earned (Silver = min 33 points)

LEED 2009 – What Changes

- From 69 possible points to 100 possible points – re-weighting of existing credits to incentivize climatic priorities
- Minor revisions to some credits to align requirements between the different rating tools (supports crossover between rating tools)
- Region-specific Innovation credits – extra innovation point for earning credits that have regional priority credit
- Still 6 Categories
- Still wide range, some points mutually exclusive
- Still 4EA achievement levels: Certified, Silver, Gold, Platinum, based on number of points earned.

LEED Interpretation Resources

- LEED-NC Reference Guide Version 2.2
- Errata Sheet for LEED-NC Reference Guide Version 2.2 – free download at usgbc.org – 10/31/07 is most recent. (make sure errata sheet is for correct edition)
- Credit Interpretation Rulings (members area of usgbc.org) posted questions from project teams and answers from USGBC – sorted by credit.
- LEED-NC Application Guide for Multiple Buildings and On-Campus Building Projects (AGMBC) – free download at usgbc.org – scoring for campus, multiple building projects
- Innovation & Design Credit Catalog – free download at usgbc.org – catalog of previously

Key to symbols used in this section:

No *Currently seldom pursued*

May *Currently sometimes pursued (ma*

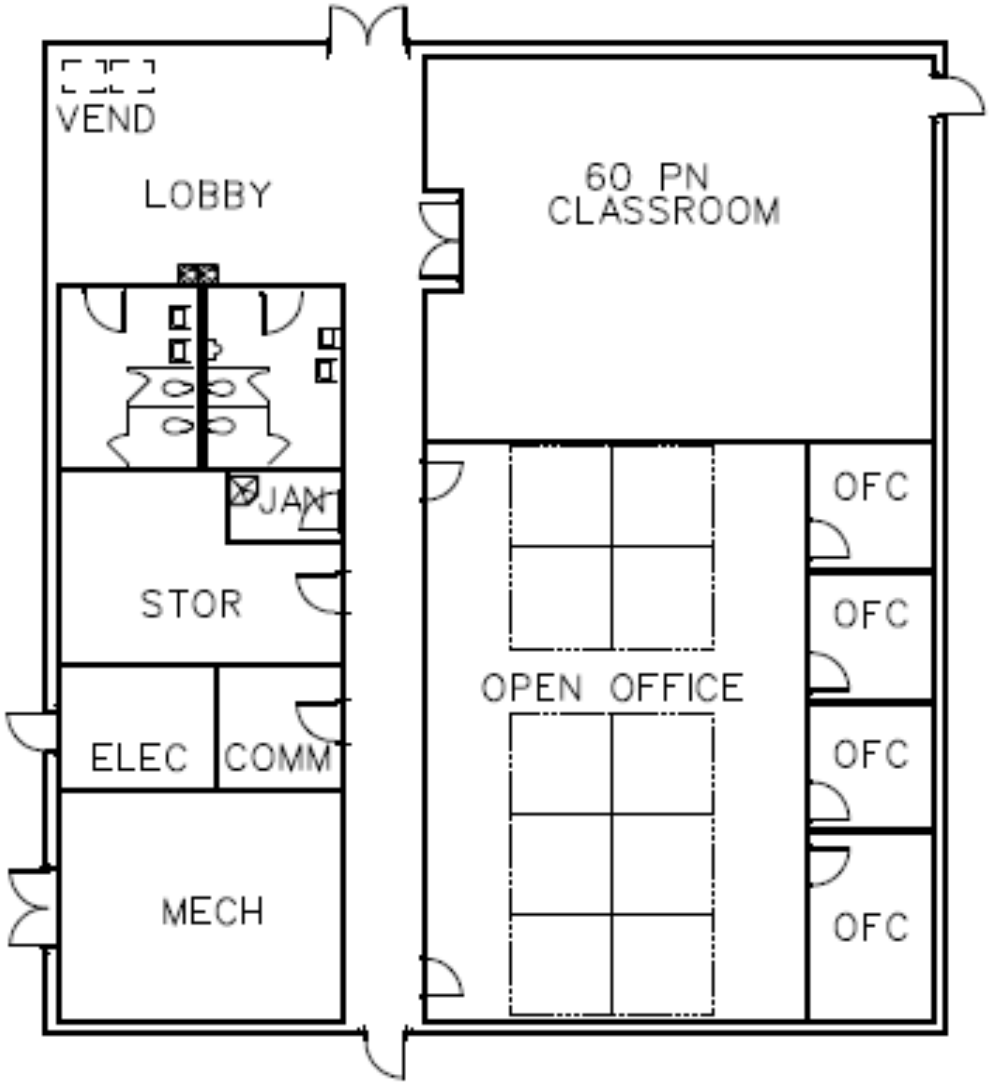
Yes *Currently usually/always pursued*

NOT guidance, commentary on observed strategies to meet LEED Silver

Our Workshop Project

Office/Classroom:

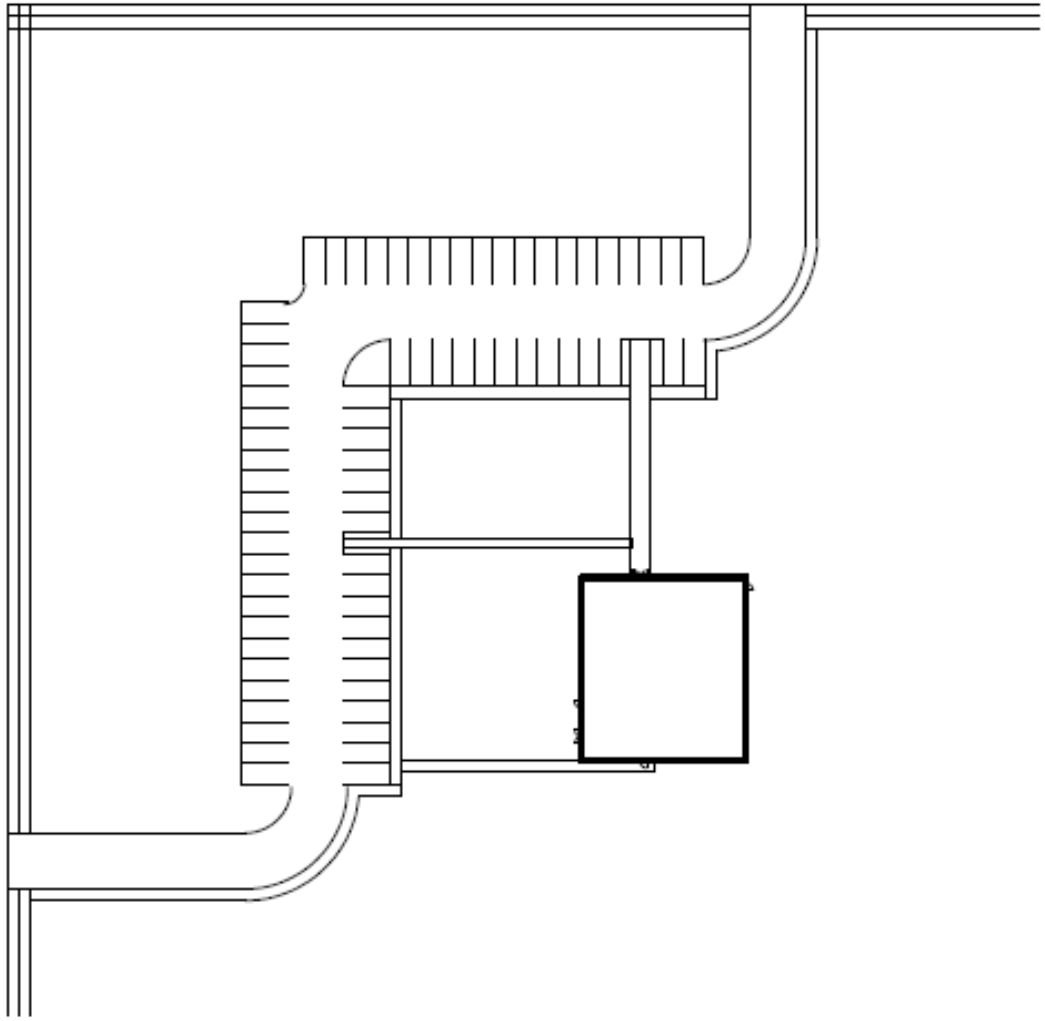
- One story
- 5500 sf
- 14FTEs
- Classroom for 60, 2EA 4-hour classes per work day
- M/F ratio staff 50%
- M/F ratio students 66%M,34%F



Our Workshop Project

Office/Classroom:

- Corner lot
- Previously developed (cleared)
- 100% parking
- Concrete sidewalks at exist roads
- Concrete walks
- Asphalt pavement



Sustainable Sites (SS)

This category covers a wide range of SDD issues, including:

- Appropriate site selection, reducing sprawl
- Supporting alternative transportation
- Preserving habitat & open space
- Erosion & pollution prevention, storm water control
- Reducing heat islands
- Reducing light pollution

1 Prerequisite, 14 possible points

Some are mutually exclusive

All LEED documentation must use the same site boundary!!

Yes

SSPR1: Construction Activity Pollution Prevention Prerequisite

Intent:

Reduce pollution from construction activities by controlling soil erosion, waterway sedimentation and airborne dust generation

Requirement:

Create and follow an Erosion and Sedimentation Control Plan that meets NPDES, regardless of site size

Notes:

By Contractor

Plan requirements are specified in MT version of UFGS ENVIRONMENTAL PROTECTION

SS Prerequisite 1: Construction Activity Pollution Prevention

Sediment traps are used to collect sediment-laden runoff from disturbed areas on construction sites

Geotextile mats not only protect ground surfaces from wind and storm water erosion but also allow vegetative growth (Source: Rolanka International, 2000)

A Slack Job Here

Way To Go!

May

SS Credit 1: Site Selection

Requirement:

Do not develop portions of sites that are:

- Prime Farmland
- Previously undeveloped and less than 5’ above FEMA 100 yr flood elevation
- Habitat for threatened or endangered species
- Within 100’ of wetlands or areas of special concern
- Previously undeveloped and within 50’ of a body of water
- Previously public parkland prior to acquisition

Notes:

Must answer no to all to take credit

Coordinate with installation on status of site

Can be on the site but can’t be developed part of site

RFPs must convey site status regarding this credit (show limits or state whether earned or not)

No

SS Credit 2: Development Density & Community Connectivity (Option 1)

Intent:

Channel development to urban areas with existing infrastructure, protect greenfields and preserve habitat and natural resources.

Requirement:

Option 1 –previously developed site in an area with minimum 60,000 sf/acre development density (typical of a 2-story downtown development)

Notes:

This density is rare on installations

AT/FP setbacks work against it

May

SS Credit 2: Development Density & Community Connectivity (Option 2)

Requirement:

Option 2 –previously developed site AND within ½ mile of residential zone with minimum 10 units/acre density AND within ½ mile of 10ea Basic Services WITH pedestrian access to all

Notes:

- **½ mile radius is as the crow flies from building main entrance. Multiple buildings: combined area of overlapping circles may be used**
- **Consider UEPH barracks a residential zone (verify density)**
- **Basic Services are listed in LEED – bank, chapel, convenience store, cleaners, fire station, clinic, school, fitness center, restaurant, others**
- **Basic Services are not limited to those listed – apply the credit's intent**
- **Only restaurants can be counted more than once (up to two restaurants)**
- **There has to be sidewalks to all**
- **RFP must convey site's status for this credit (coordinate with**

May

SS Credit 3: Brownfield Development

Intent

Rehabilitate damaged sites where development is complicated by environmental contamination, reducing pressure on undeveloped land.

Requirement:

Develop on a site defined as a brownfield. “Real property, the expansion, redevelopment, or reuse of which may be complicated by the presence or potential presence of a hazardous substance, pollutant or contaminant” (EPA)

Notes:

Easy definition: any site requiring remediation (on site, not just part of project)

Remediation may be by others, but must be because of the project

RFP must convey site’s status for this credit (coordinate with installation)

AGMBC: If site is a brownfield, all buildings may take credit even if building is not located on a contaminated portion of site

No

SS Credit 4.1 Alternative Transportation: Public Transportation Access

Requirement (2 Options)

Locate project within ½ mile of an existing or planned and funded commuter light rail or subway station.

OR

Locate project within 1/4 mile of one or more bus stops for 2 or more public or campus bus lines useable by building occupants.

Notes:

Distance is measured by actual pedestrian path from main entrance to stop (not radius)

Must be at least 2 bus routes & both available to occupants

RFP must convey site's status for this credit (coordinate with installation)

Discuss at planning charette – examine mass transit plans and needs, include/program for bus stops and sidewalks if applicable

Yes

SS Credit 4.2 Alternative Transportation: Bicycle Storage & Changing Rooms

Requirement:

For non-residential, provide secure bicycle storage within 200 yards of building entrance for min 5% of peak period building users AND provide shower and changing facilities, in the building or within 200 yards of building entrance, for min 0.5% FTE occupants.

OR

For residential, provide covered storage facilities for securing bicycles for min 15% of building occupants.

Notes:

Proximity to building entrance

Showers may be in another nearby building but must be useable by building occupants (do not count private use shower)

Bike racks are for FTEs PLUS students/visitors etc.

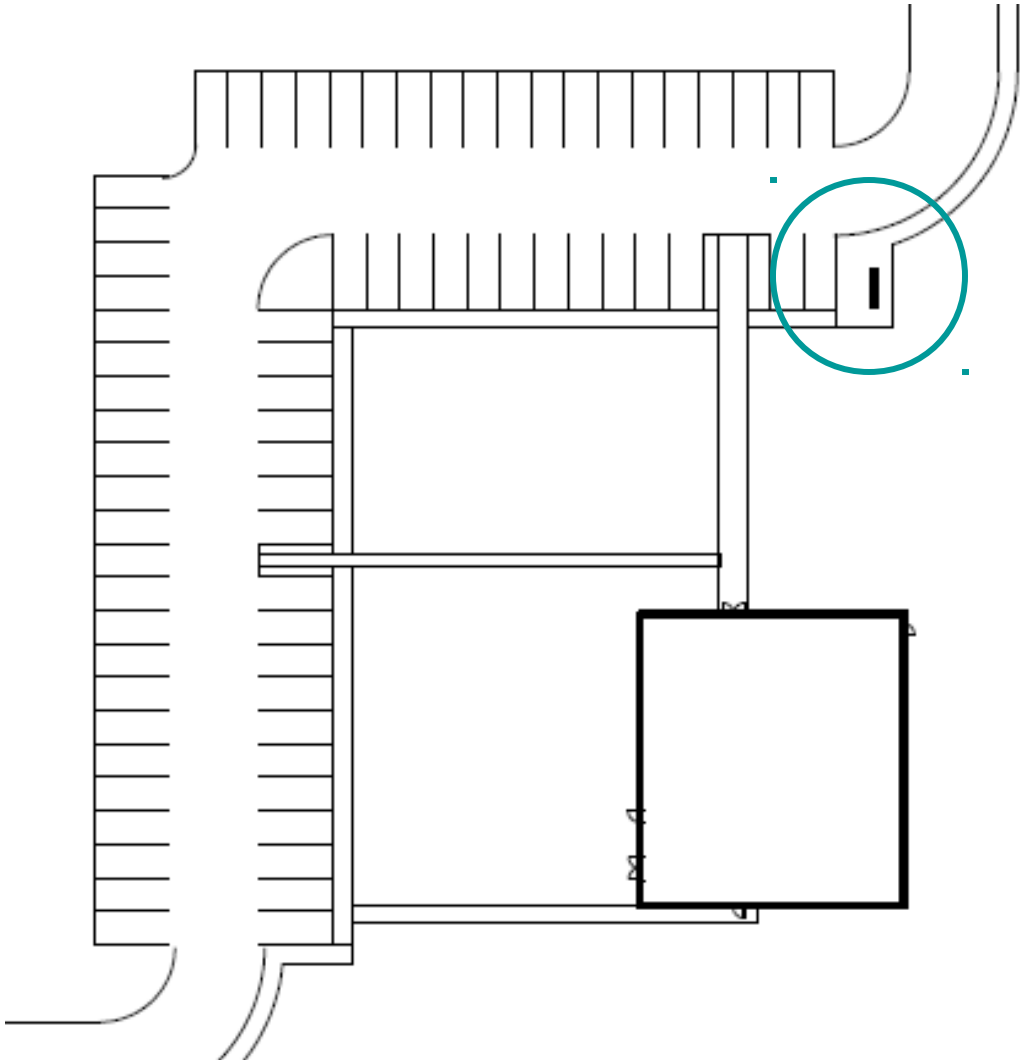
Showers are for FTEs only (0.5%FTE = no. of showers required)

Program/include shelters for bike racks at UEPH barracks!!

SS Credit 4.2 Alternative Transportation: Bicycle Storage & Changing Rooms

Bike storage:

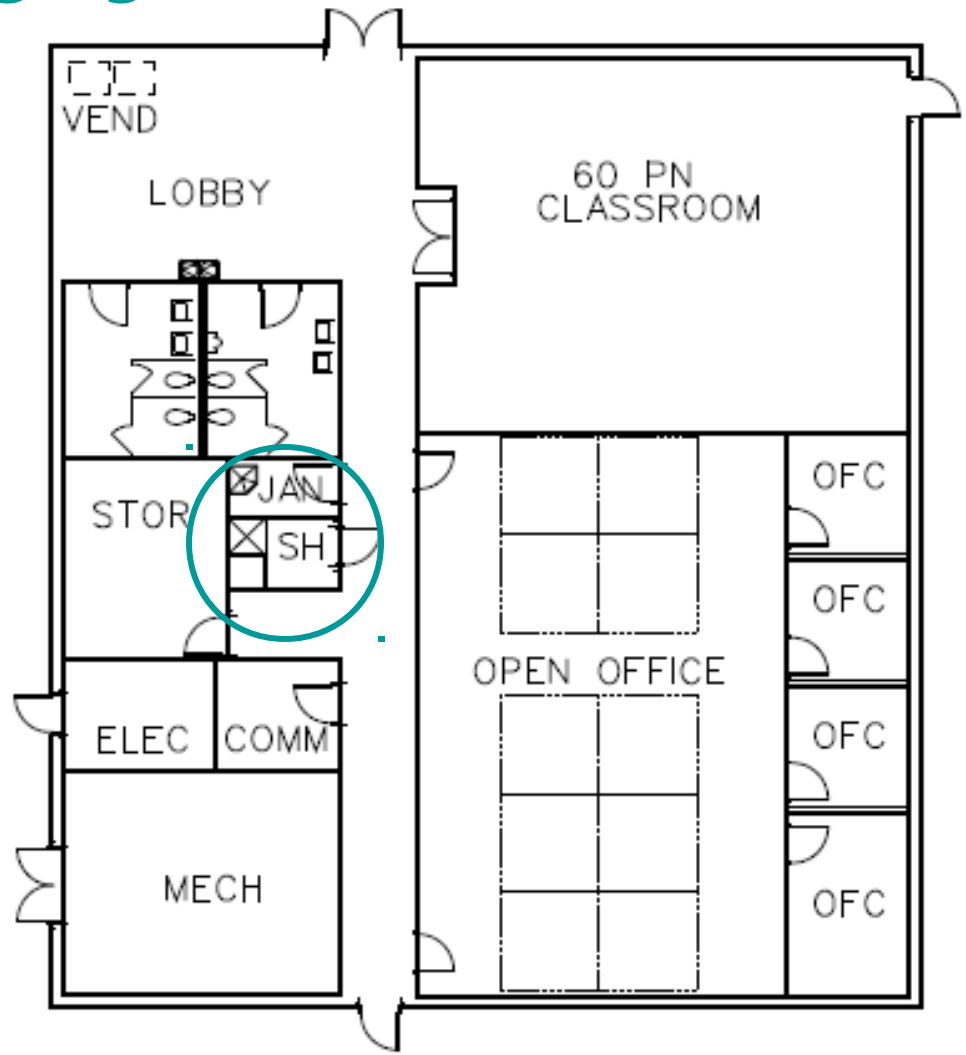
- 60 students
- 14 FTEs
- 74 peak usage
- Rack for 5% peak usage
- 4 bikes



SS Credit 4.2 Alternative Transportation: Bicycle Storage & Changing Rooms

Shower:

- 0.5% FTEs only
- 14FTEs
- 1 shower



Yes

SS Credit 4.3 Alternative Transportation: Low-Emission & Fuel-Efficient (LE/FE) Vehicles

Requirement:

Option 1 – Provide LE/FE vehicles AND preferred parking for them for 3% FTEs

OR

Option 2 – Provide preferred parking for LE/FE vehicles for 5% of total parking capacity

OR

Option 3 – Provide alternative fuel refueling station for 3% of total parking capacity

Notes:

LE/FE vehicles include hybrids, electric

Option 1: Can’t buy vehicles with construction funds

Option 2: Almost Free (signage)!

Option 3: Need to coordinate with installation since they will maintain/provide vehicles

Yes

SS Credit 4.4 Alternative Transportation: Parking Capacity

Requirement:

Option 1 – Nonresidential: Provide parking to meet but not exceed requirement AND make 5% of spaces preferred carpool parking

OR

Option 2 – Nonresidential: Provide parking for less than 5% FTEs AND make 5% of spaces preferred carpool parking

OR

Option 3 – Residential: Provide parking to meet but not exceed requirement AND facilitate shared vehicle use (shuttle/carpool drop off area, ride boards)

OR

Option 4: Provide no new parking

Notes:

Parking requirement is determined by standard design criteria (if none, determined by installation)

“Preferred parking” is close to main entry

All options: Almost Free (signage), easy

Our Project: Signage for 4EA reserved carpool spaces

No

SS Credit 5.1: Site Development: Protect or Restore Habitat

Requirement:

For Greenfield sites, limit site disturbance to 40’ from face of building, 10’ from walkways/parking/utilities under 12” dia, 15’ from primary roads and utilities over 12” dia and 25’ from constructed permeable areas where compaction must be limited (permeable pavement, stormwater detention facilities, playing fields)

OR

For previously developed or graded sites, restore or protect 50% of site (excluding building footprint) with native or adapted vegetation.

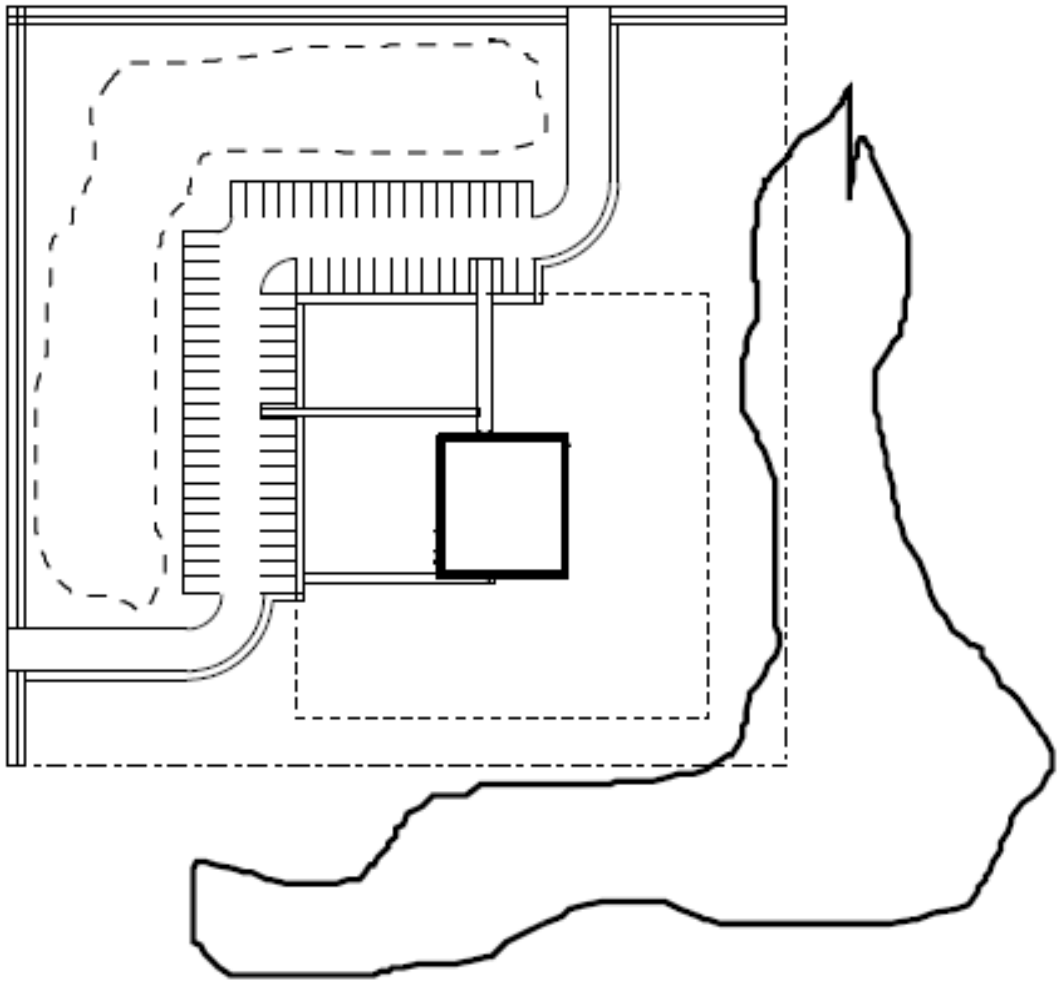
Notes:

- **Greenfield requirements hard, must be coordinated with timber harvest by others**
- **Previously Developed site: Restored area plus protected area = min 50% of site**
- **Only exclude building footprint (not parking)**
- **Native/adapted plants are indigenous to a locality or cultivars of native plants adapted to local climate and not considered invasive or noxious weeds.**
- **Be careful about vegetation types in AT/FP setbacks**
- **Location of site boundary can make or break this point!! Include natural areas in site boundaries (not the same as**

SS Credit 5.1: Site Development: Protect or Restore Habitat

Baseline:

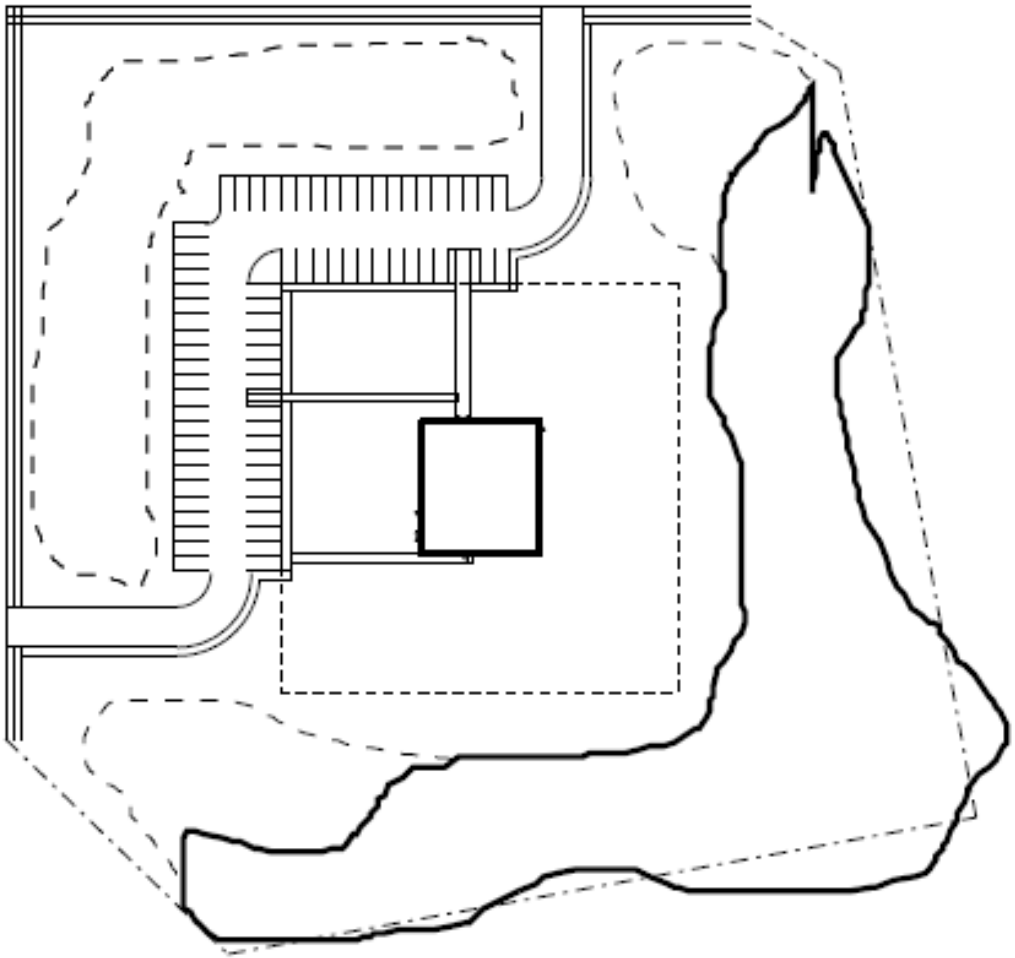
- 191,800sf site area
- Minus 5500sf bldg footprint
- Balance 186,300sf
- Restored/protected habitat required (50%): 93,150sf
- 3700sf existing habitat
- 30,500sf restored habitat
- 58,950sf delta



SS Credit 5.1: Site Development: Protect or Restore Habitat

Revise Site Boundary:

- 274,700sf site area
- Minus 5500sf bldg footprint
- Balance 269,200sf
- Restored/protected habitat required (50%): 134,600sf
- 82,900sf existing habitat
- 52,500sf restored habitat
- (800sf) delta



Future projects must respect this site boundary (no double dipping!)

Yes

SS Credit 5.2 Site Development: Maximize Open Space

Intent:

Provide a high ratio of open space to development footprint to promote biodiversity.

Requirement:

Option 2 (applies to military installation): Provide vegetated open space adjacent to building that is equal in area to building footprint.

Notes:

Free! AT/FP setbacks usually get it

Does not have to be native plants, just vegetated & not paved

AGMBC Alternative: Open space may be at another location on installation. Must be aggregated and contiguous, must be placed in a permanent reserve status and must be in a natural state. Coordinate with installation to establish a “bank” for projects to draw on when needed.

Yes

SS Credit 6.1 Stormwater Design: Quantity Control

Intent:

Limit disruption of natural hydrology by reducing impervious cover, increasing on-site filtration and managing stormwater runoff.

Requirement:

Option 1 – Existing imperviousness less than or equal to 50%: Post-development peak discharge rate and quantity not to exceed pre-development peak discharge rate and quantity for the one-year and two-year, 24-hr design storms.

OR

Stormwater management plan that protects receiving stream channels from excessive erosion (protection strategy and quantity control)

Option 2 - Existing imperviousness greater than 50%: 25% decrease in the volume of stormwater runoff from the two-year, 24-hr design storm.

Notes:

Often required anyway

May

SS Credit 6.1 Stormwater Design: Quality Control

Intent:

Reduce or eliminate water pollution by reducing impervious cover, increasing on-site infiltration and removing pollutants from stormwater runoff.

Requirement:

Capture and treat runoff from 90% of the average annual rainfall using acceptable best management practices (BMPs). Must remove 80% of average annual total suspended solids.

Notes:

On-site stormwater treatment – consider space needed when determining site boundaries, program for structures if needed.

Use Low Impact Development (LID) practices

- Pervious pavement, vegetated swales, constructed wetlands, on-site retention, capture & use stormwater for irrigation or grey water uses

Recharge Garden

Courtesy Cahill & Associates

Bio Swales & Porous

Porous Asphalt

Courtesy Cahill & Associates

Constructed Wetland

Courtesy Cahill & Associates

May

SS Credit 7.1 Heat Island Effect: Non Roof

Intent:

Reduce heat islands (thermal gradient differences between developed and undeveloped areas) to minimize impact on microclimate and human and wildlife habitat.

Requirement:

Option 1 – Any combination of the following for 50% of the site hardscape (including roads, sidewalks, courtyards and parking):

- **Vegetative shade within 5 years of occupancy**
- **Paving materials with Solar Reflectance Index (SRI) of at least 29**
- **Open grid paving system (must be 50% vegetated voids)**

Option 2 – Minimum 50% of parking spaces underground or under a roof. Roof over parking must have min 29 SRI.

Notes:

PC concrete meets SRI reflectance requirement

Shade is solar noon on summer solstice (direct overhead) – need to estimate 5 yr growth/spread.

Option 1 cannot include shade structures

Open grid paving is grasscrete or similar

Permeable Asphalt

Turfstone

Eco-stone
EcoGrid

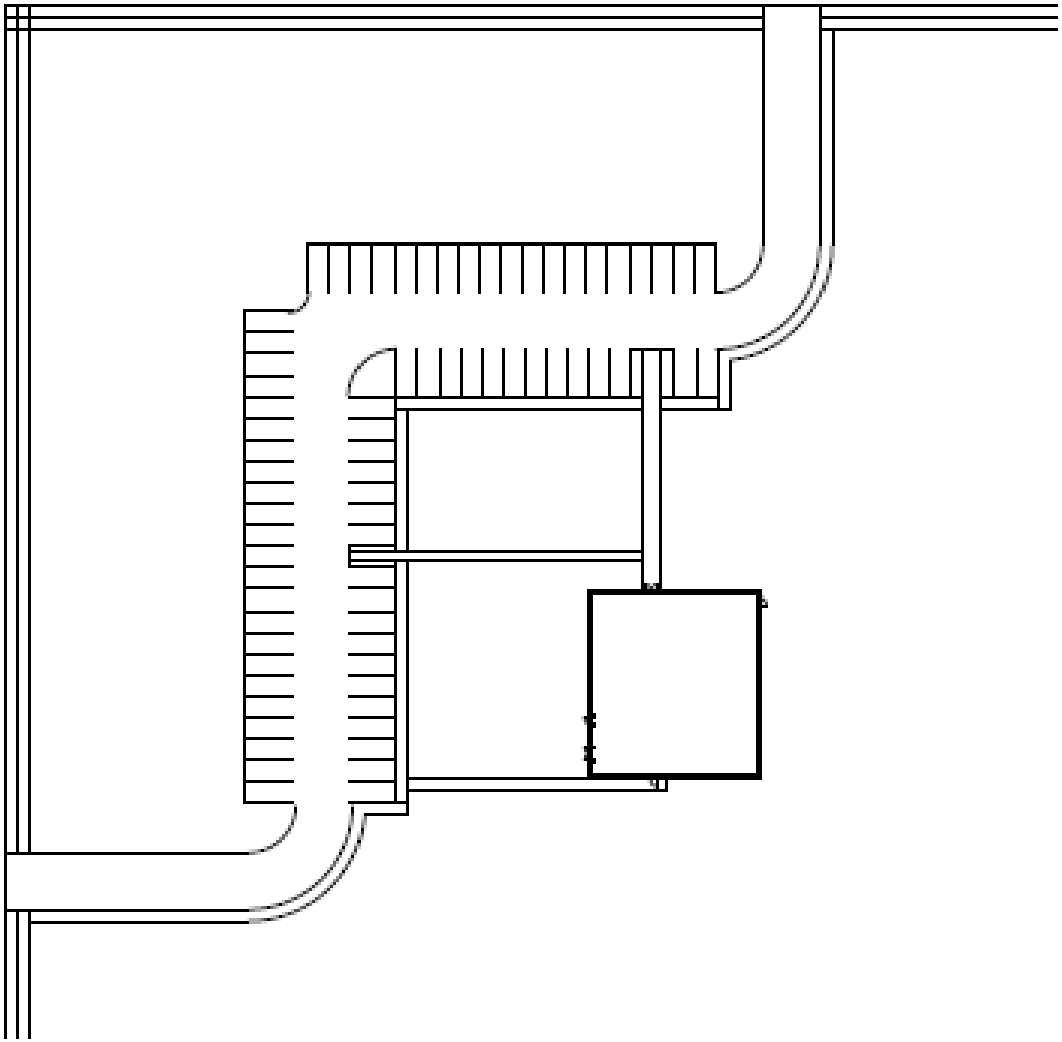
Uni-Lock

Netpave

SS Credit 7.1 Heat Island Effect: Non-Roof

Baseline:

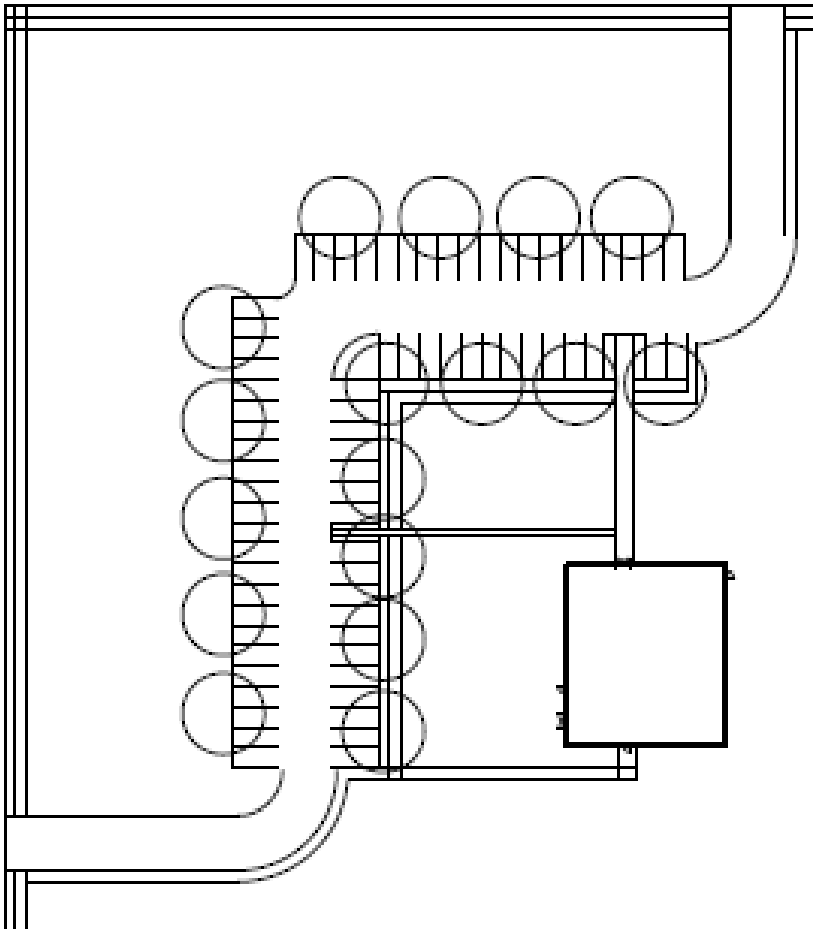
- 7670sf concrete walks
- 26,840sf asphalt parking & drives
- 34,510sf total hardstand
- Reflective/shaded required (50%): 17,255sf
- Reflective/shaded provided (conc): 7670sf
- 9585sf delta



SS Credit 7.1 Heat Island Effect: Non-Roof

Add Vegetative Shading:

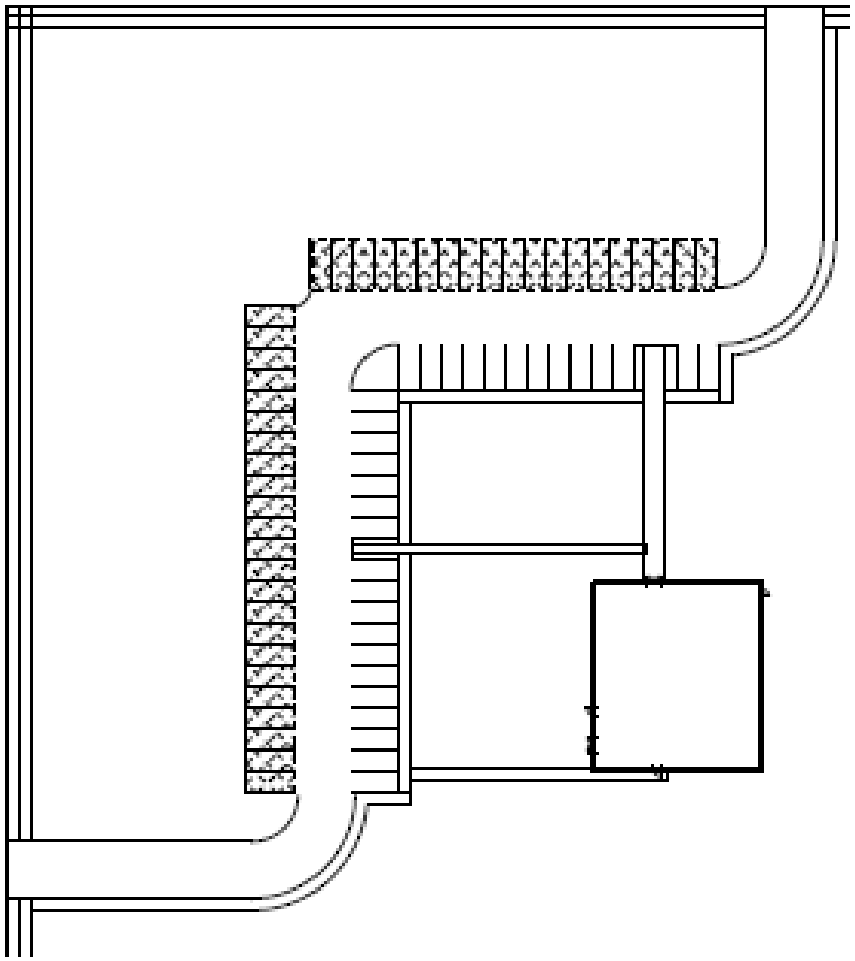
- 17EA 35’dia trees
  - 400sf shade/tree
  - Planting strip between walk & parking
  - $11,000 add
- Reflective/shaded required (50%): 17,255sf
- Concrete walks: 7670sf
- Trees: 6800sf
- 2785sf delta



SS Credit 7.1 Heat Island Effect: Non-Roof

Substitute Open Grid Paving:

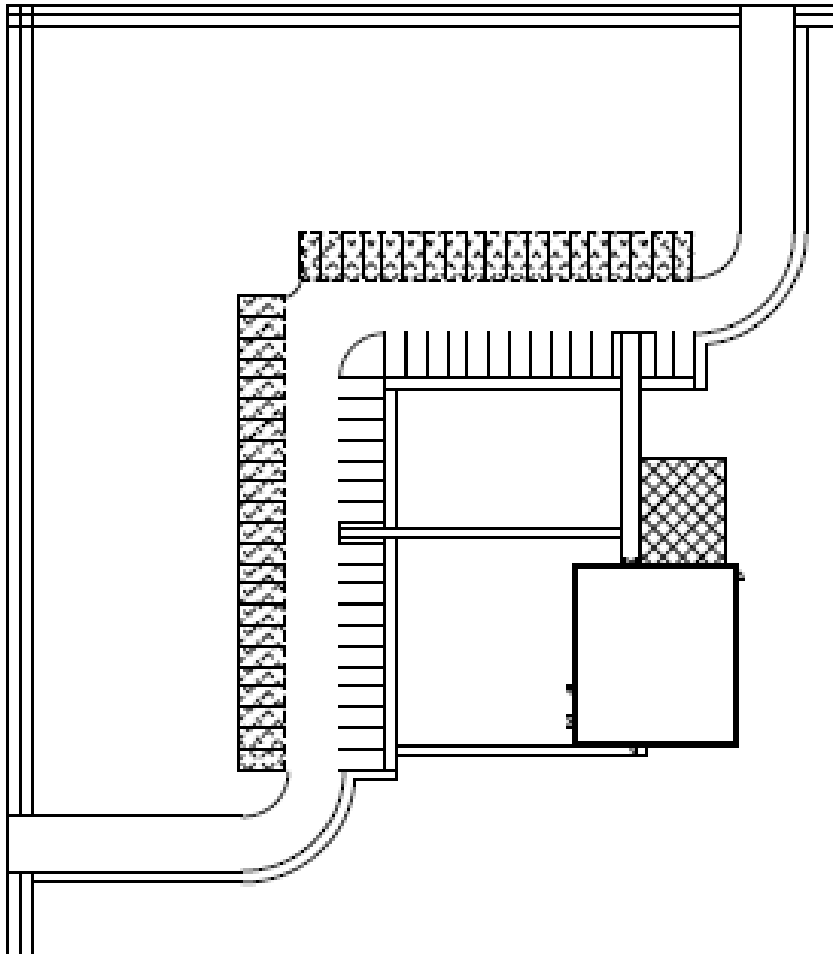
- 7700sf open grid pavement
  - $14,000 add
- Reflective/shaded required (50%): 17,255sf
- Concrete walks: 7670sf
- Open grid pavement: 7700sf
- 1885sf delta



SS Credit 7.1 Heat Island Effect: Non-Roof

Add Concrete Plaza and substitute open grid pavement :

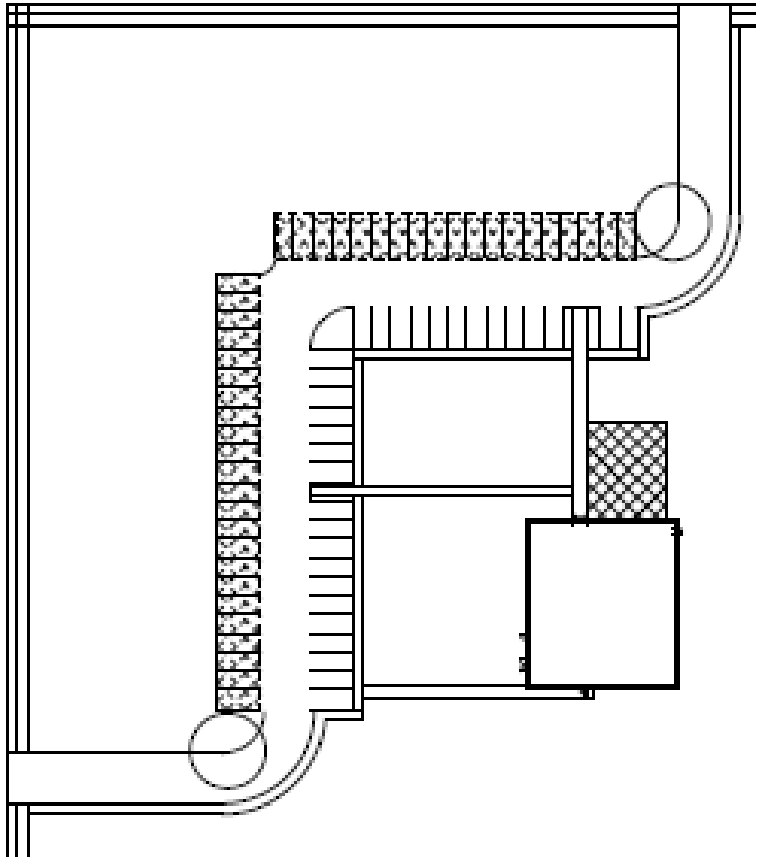
- 7700sf open grid pavement
  - $14,000 add
- 2800sf plaza
  - $10,000 add
- Reflective/shaded required (50%): 18,655sf
- Concrete walks & plaza: 10,470sf
- Open grid pavement: 7700sf
- 485sf delta



SS Credit 7.1 Heat Island Effect: Non-Roof

Add trees, add concrete plaza and substitute open grid pavement :

- 2EA 35'dia trees (400sf shade ea)
  - $1200 add
- 7700sf open grid pavement
  - $14,000 add
- 2800sf plaza
  - $10,000 add
- Reflective/shaded required (50%): 18,655sf
- Concrete walks & plaza: 10,470sf
- Open grid pavement: 7700sf
- Vegetative shading: 800sf
- (315sf) delta



Yes

SS Credit 7.2 Heat Island Effect: Roof

Requirement:

Option 1 – Use roofing materials with min SRI as follows for min 75% of roof area:

- Slope less than 2:12 – SRI 78
- Slope over 2:12 – SRI 29

Option 2 – Minimum 50% of roof area vegetated roof

Option 3 – Combination of Options 1 and 2 above so that (SRI roof area / .75) + (veg roof area / .5) = total roof area

Notes:

SRI is a combination of reflectance and emittance – not the same as Energy Star roof criteria (reflectance only)

Solar Reflectance (albedo) = ability to reflect solar radiation

Emittance = ability to release stored heat

Product info available at Cool Roof Rating Council, www.coolroofs.org

Metal roofs: cool coatings that meet SRI now available in many light and dark colors

Lighter weight vegetated roof systems available, helpful if stormwater management is a problem

HYDROTECH

American Hydrotech, Inc.
phone 800.877.6125
www.hydrotechusa.com

Rediger Associates

(Local Sales Representative)
Rediger Associates
phone 847.695.3299
ronrediger@aol.com

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Vegetation
LiteTop® - Engineered Soil
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Moisture Mat SSM45®
STYROFOAM® - Insulation
WSF40® - Root Barrier
HYDROFLEX® - Protection Course
MM6125® - Rubberized Asphalt
Surface Conditioner
Substrate

Saturated Weight 24#-30#/Sq ft
Total Installed Cost* $12-$20/Sq ft
*(roof membrane thru vegetation, cost will vary per project)

Yes

SS Credit 8: Light Pollution Reduction

Requirement:

Interior lighting: angle of maximum candela from each interior luminaire shall intersect opaque building surfaces and not exit through windows.

OR

All non-emergency interior lighting shall be automatically controlled to turn off during non-business hours. Provide manual override for after hours use.

AND

Exterior lighting: Do not exceed 80% of ASHRAE/IESNA 90.1 lighting power densities for exterior areas and 50% of ASHRAE/IESNA 90.1 lighting power densities for building façade and landscape lighting. Follow IESNA RP-33 zone classifications and requirements for the specific zone.

Notes:

IESNA RP-33 deals with illuminance value at site boundary and lumen angle (light trespass).

AGMBC Alternative: Develop campus lighting master plan, accommodating shared lighting. Must still meet credit requirements.

If exterior lighting design is by a privatized utility, their contract must include LEED documentation for their portion of work.

IDG needs to accommodate cutoff fixtures needed to meet credit requirement.

The United States at Night

N O A A
Satellite photo revealing the estimated **30%** of all US outdoor lighting being directed skyward as waste. Conservatively estimated at **$1.5 billion dollars in wasted electricity** yearly, this 30% requires the burning of **6,000,000 tons of coal** each year to generate this electricity waste.
Estimated by the International Dark-Sky Association.

Water Efficiency (WE)

This category covers conservation of fresh water in both site uses (irrigation) and building uses.

5 possible points

All documentation must use the same site boundary!!

Yes

WE Credit 1.1 and 1.2: Water Efficient Landscaping

Requirement:

Credit WE 1.1: Reduce potable water consumption for irrigation by 50%.

Credit WE 1.2: Reduce potable water consumption for irrigation by 100%.

Notes:

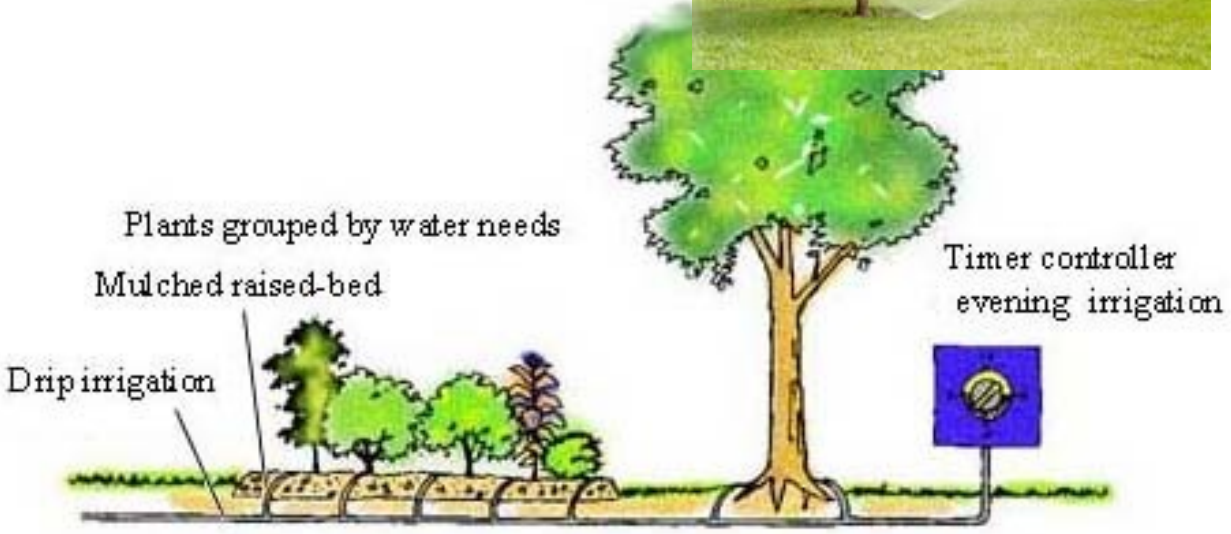
Must use same irrigated area in both baseline and design cases.

Achieve with plant selection, high-efficiency/controlled irrigation system, use of collected stormwater (program the collection structure, pumps, etc)

If temporary irrigation is provided for establishment period, must now be REMOVED at end of establishment period to earn credit (cannot abandon in place).

Projects with no irrigation earn both WE credits 1.1 and 1.2.

Projects with no landscaping are ineligible for these credits



Water-efficient irrigation

May

WE Credit 2: Innovative Wastewater Technologies

Intent:

Reduce generation of wastewater and potable water demand, while increasing the local aquifer discharge.

Requirement:

Option 1 - Reduce potable water use for sewage conveyance by 50% with water conserving fixtures and/or using nonpotable water (graywater, captured rainwater)

OR

Option 2 – Treat 50% of wastewater on-site to tertiary standards. Treated water must be infiltrated or used on-site.

Notes:

High-efficiency fixtures overlaps WE3 Water use reduction credit (check this one if pursuing the other credit).

On-site treatment examples include constructed wetlands, biological reactors (feasible for remote sites)

Yes

WE Credit 3.1 and 3.2: Water Use Reduction

Intent:

Maximize water efficiency within buildings to reduce the burden on municipal water supply and wastewater systems.

Requirement:

WE Credit 3.1 - Reduce building water use by 20% below baseline of EPAct 1992 fixture performance requirements.

WE Credit 3.2 - Reduce building water use by 30% below baseline of EPAct 1992 fixture performance requirements.

Notes:

Calculations include ONLY toilets, urinals, lavatories, showers & sinks (not process water).

High-efficiency fixtures, waterless urinals overlaps WE2 wastewater.

If you make it to 30% you take BOTH credits

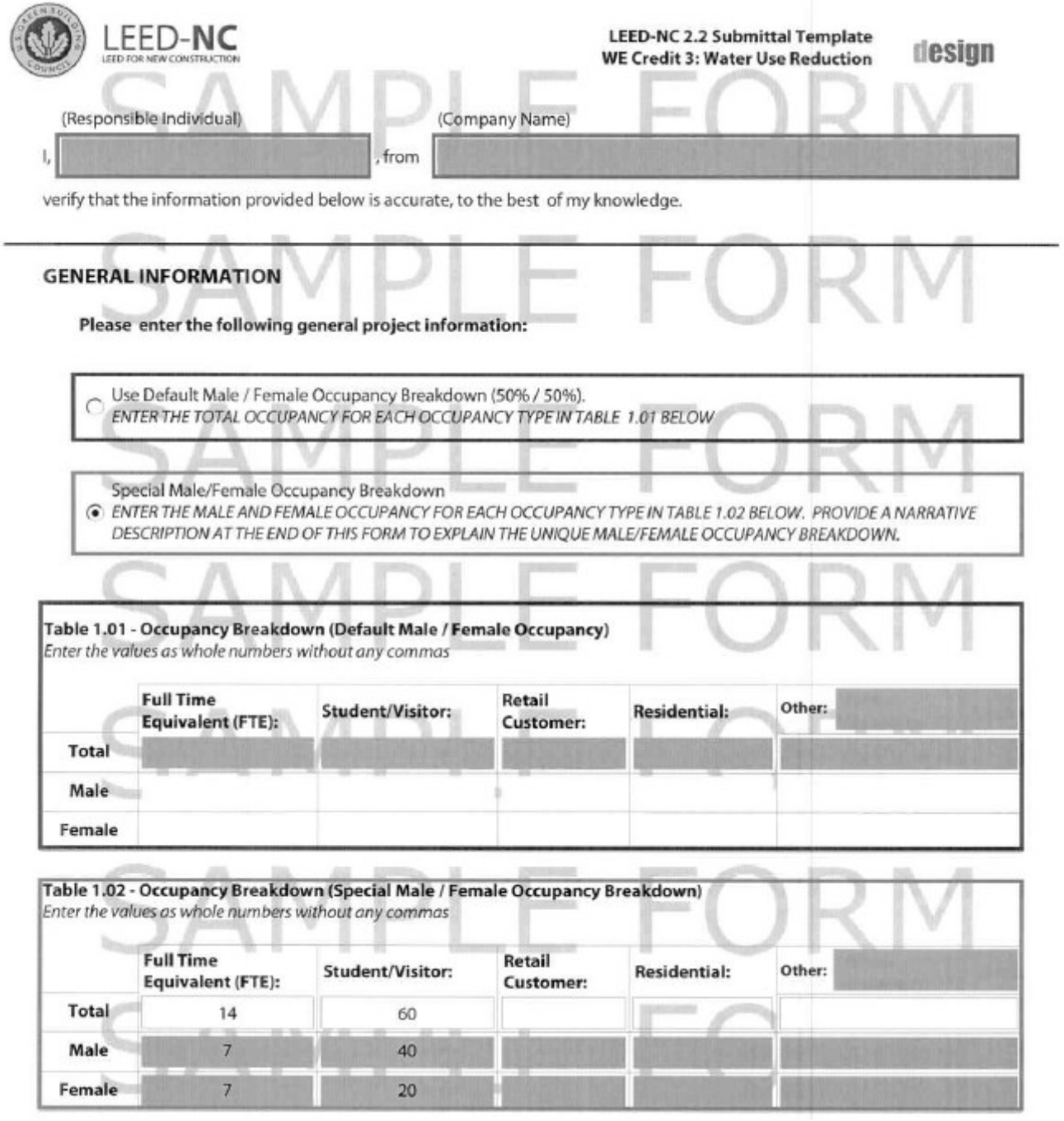
LEED Letter Template does calculations for you!

- Low-flow toilet
- Dual flush toilet
- Pressure assist toil
- Waterless urinal
- Metered faucet
- Sensor faucet
- Low-flow shower

Push-rod automatic faucet controls, reduce water consumption by over 40% and minimize piping redundancies by mixing hot and cold water into single pipe supply lines. (Cambria office building)

WE 3.1 & 3.2: Water Use Reduction

- Enter occupancy breakdown (M/F ratio)
- Select Default (50/50) or Special
- If Default, add totals
- If Special, add M/F actuals



LEED-NC
LEED FOR NEW CONSTRUCTION

LEED-NC 2.2 Submittal Template
WE Credit 3: Water Use Reduction

design

(Responsible Individual) I, _____, from (Company Name) _____

verify that the information provided below is accurate, to the best of my knowledge.

SAMPLE FORM

GENERAL INFORMATION

Please enter the following general project information:

○ Use Default Male / Female Occupancy Breakdown (50% / 50%).
ENTER THE TOTAL OCCUPANCY FOR EACH OCCUPANCY TYPE IN TABLE 1.01 BELOW

◉ Special Male/Female Occupancy Breakdown
ENTER THE MALE AND FEMALE OCCUPANCY FOR EACH OCCUPANCY TYPE IN TABLE 1.02 BELOW. PROVIDE A NARRATIVE DESCRIPTION AT THE END OF THIS FORM TO EXPLAIN THE UNIQUE MALE/FEMALE OCCUPANCY BREAKDOWN.

Table 1.01 - Occupancy Breakdown (Default Male / Female Occupancy)
Enter the values as whole numbers without any commas

	Full Time Equivalent (FTE):	Student/Visitor:	Retail Customer:	Residential:	Other:
Total					
Male					
Female					

Table 1.02 - Occupancy Breakdown (Special Male / Female Occupancy Breakdown)
Enter the values as whole numbers without any commas

	Full Time Equivalent (FTE):	Student/Visitor:	Retail Customer:	Residential:	Other:
Total	14	60			
Male	7	40			
Female	7	20			

WE 3.1 & 3.2: Water Use Reduction

- Revise defaults for urinals, days of operation if needed

Table 1.02 - Occupancy Breakdown (Special Male / Female Occupancy Breakdown)

Enter the values as whole numbers without any commas

	Full Time Equivalent (FTE):	Student/Visitor:	Retail Customer:	Residential:	Other:
Total	14	60			
Male	7	40			
Female	7	20			

Percent of male restrooms with urinals:	100	%
Annual Days of Operation (1-365):	250	

SAMPLE FORM

WE 3.1 & 3.2: Water Use Reduction

Table 1.1 - Flush Fixture Data - Baseline Case

Fixture Reference	Baseline Fixture Type	Gender	Flush Rate (GPF)	Daily Uses Per Person: FTE	Student / Visitor	Retail Customer	Residential		Included in Project?
1	Conventional Water Closet	Female	1.6	3.0	0.5				☒
2	Conventional Water Closet	Male	1.6	1.0	0.1				☒
3	Conventional Urinal	Male	1.0	2.0	0.4				☒

Annual Baseline Flush Fixture Water Usage: 33,900 gallons/year

Baseline Case (flush fixtures, flow fixtures):

- Deselect fixtures you don't have
- Template calculates water usage automatically

Table 1.2 - Flow Fixture Data - Baseline Case

Fixture Reference	Baseline Fixture Type	Flow Rate (GPM)	Duration (seconds)	Daily Uses Per Person: FTE	Student / Visitor	Retail Customer	Residential		Included in Project?
A	Conventional Lavatory	2.5	15	3.0	0.5				☒
B	Conventional Shower	2.5	300	0.1					☒
C	Kitchen Sink	2.5	15						☐
D	Janitor Sink	2.5	15	0.1					☒
E									☐

TOTAL ANNUAL BASELINE WATER USAGE: 40,143 gallons/year

Annual Baseline Flow Fixture Water Usage: 15,843 gallons/year

WE 3.1 & 3.2: Water Use Reduction

Table 2.1 - Flush Fixture Data - Design Case

Fixture Reference	Design Case Fixture Type	Gender	Fixture Manufacturer	Fixture Model	Flush Rate (GPF)	Percent of Occupants	Daily Uses Per Person: FTE	Daily Uses Per Person: Student / Visitor	Daily Uses Per Person: Retail Customer	Daily Uses Per Person: Residential
1	Conventional Water Closet	Female			1.6	100 %	3.0	0.5		
2	Conventional Water Closet	Male			1.6	100 %	1.0	0.1		
3	Non-Water Urinal	Male			0.0	100 %	2.0	0.4		
						%				
						%				
						%				

Annual Design Case Flush Fixture Water Usage: 16,800 gallons/year

Design Cas (flush):

Use pull-down menus to select fixture types (dual flush, low flow, waterless

Template calculates water usage automatically

Our project: We'll try just waterless urinal **(FY10 Army mandated)**

WE 3.1 & 3.2: Water Use Reduction

Design Case (flow):

Use pull-down menus for fixture types

Template calculates water usage automatically

Our project: We'll try low flow lavatory & low flow shower

Table 2.2 - Flow Fixture Data - Design Case

Fixture Reference	Design Case Fixture Type	Fixture Manufacturer	Fixture Model	Flow Rate (GPF)	Percent of Occupants	Duration (seconds)	Daily Uses Per Person: FTE	Student / Visitor	Retail Customer	Residential
A	Low-Flow Lavatory			1.8	100 %	15	3.0	0.5		
B	Low-Flow Shower			1.8	100 %	300	0.1			
C					100 %	15				
D					100 %	15	0.1			
					%					
					%					
					%					
					%					

Annual Design Case Flow Fixture Water Usage:	11,250	gallons/year
Annual Design Case Flush and Flow Fixture Water Usage:	28,050	gallons/year

SAMPLE FORM

WE 3.1 & 3.2: Water Use Reduction

WATER USE SUMMARY

Baseline Case - Annual Water Consumption (gal):	40,143	gallons/year
Design Case - Annual Water Consumption (gal):	28,050	gallons/year
Total Annual Non-Potable Water Consumption (gal):		gallons/year
Total Water Savings:	30.1	%

For credit compliance, a water savings of at least 20% earns 1 LEED point, and a water savings of at least 30% earns 2 LEED points.

- Fill in section on non-potable water use if applicable (not shown)
- Template calculates water usage and % reduction automatically
- Use template as a design tool
- **Our project:** waterless urinals, low flow lavatories and low flow shower get us both points!

Energy and Atmosphere (EA)

This category addresses reducing the amount of energy a building consumes and using more benign forms of energy.

3 Prerequisites, 17 possible points

2 points are mandatory

Yes

EAPR1: Fundamental Commissioning Prerequisite

Intent:

Verify that the building's energy-related systems are installed, calibrated and perform according to the owner's project requirements, basis of design, and construction documents.

Requirement:

Must commission as a minimum all HVAC & controls, lighting controls, domestic water heating, other energy related systems provided – include in contract requirements.

Qualified Commissioning Authority (CxA) - documented experience 2 projects

Owner's Project Requirements document (OPR) – by RFP preparer/designer.

Basis of Design document (BOD) – by Designer of Record.

Commissioning Plan – by design team with CxA

Commissioning Report – by CxA at closeout

Notes:

CxA can change during course of project, may be employee of/hired by designer or construction contractor, may only be member of design/construction team if <50,000sf

USACE templates available for OPR, BOD, Commissioning Plan

Yes

EAPR2: Minimum Energy Performance Prerequisite

Intent:

Establish the minimum level of energy efficiency for the building.

Requirement:

Comply with mandatory provisions of ASHRAE 90.1-2004 (without amendments)

AND

Comply with the prescriptive or performance requirements of ASHRAE 90.1-2004 (without amendments)

Notes:

Our criteria before EPAct 2005 – we have to exceed this now

Yes

EAPR3: Fundamental Refrigerant Management Prerequisite

Intent:

Reduce ozone depletion.

Requirement:

New Building HVAC systems: Zero use of CFC-based refrigerants.

Existing Buildings re-using existing HVAC systems: Complete a comprehensive CFC phase-out conversion prior to project completion.

Yes

EA Credit 1: Optimize Energy Performance

Requirement:

Option 1 – Whole Building Energy Simulation

Earn up to 10 points based on percent energy cost savings over baseline building

MINIMUM 2 POINTS ARE NOW LEED MANDATORY (14% reduction new building, 7% reduction existing building)

(Option 2 - Prescriptive compliance Path for Office buildings under 20,000 sf only – not applicable)

(Option 3 – Prescriptive Compliance Path with Advanced Buildings Benchmark Version 1.1 – not applicable)

Notes:

Army MT projects must earn points associated with EPACT compliance.

EPACT is energy USE reduction vs LEED is energy COST reduction

EPACT calcs exclude process loads vs LEED includes them

MT CERL Technology Solution Sets for EPACT: CERL adding summary data to technology solution sets, will provide partially completed Letter Template if USGBC certified project (minus utility cost). *Contact Dale Herron if you need it.*

This is not just mechanical – need envelope, lighting contributi

No

EA Credit 2: On-Site Renewable Energy

Requirement:

Use on-site renewable energy systems to offset building energy cost.

- 2.5% of building energy renewable = 1 point
- 7.5% of building energy renewable = 2 points
- 12.5% of building energy renewable = 3 points

Notes:

On-site power generation from wind, solar, water, geothermal OR to offset space-heating, space-cooling, water heating energy consumption.

ELIGIBLE: Photovoltaic, wind, hydro for power, geothermal systems that use deep-earth water or steam for power or thermal energy, active solar system for thermal energy.

NOT ELIGIBLE FOR THIS CREDIT: passive solar, daylighting, geo-thermal or ground source heat pumps (count under EA1)

EPAct includes renewable energy milestones (7.5% by 2013) – coordinate with Installation Energy Manager –

Photovoltaics

Certain materials can convert sunlight into electricity (semiconductor)

"Solar cells", "PV systems"

Today's systems convert 7% to 17% of sunlight into electricity ("conversion efficiency")

Consumes no fuel, produces no pollution, silent (no moving parts)

Highly reliable, last 20 years or longer, little maintenance

Orient to maximize sunlight capture

Largest current market is rural/developing areas: One 50Wp module= 5 fluorescent bulbs, radio, 15"b/w TV for 5 hrs/day

- **Also water pumping, remote industrial applications**
- **Remote site, small power, outdoor lighting, residential power**

The sun's energy that strikes the earth in one minute exceeds the total amount of energy consumed by all the world's people in one year!!

Photovoltaics

Modular: Cells, modules, arrays (add or move modules)

PV modules are rated by Peak Wattage (Wp)

PV modules cost around $6 per watt ($10 to $15 w/ battery, inverter, etc), produce electricity for as little as 25 to 50 cents per kWh

Uses:

- **Direct use of DC power generated (pumps, fans)**
- **With battery storage (DC or AC with inverter – lights, sensors, recording equipment)**
- **With backup generator power (constant power requirement, larger requirement)**
- **Connected to local utility (utility provides backup power, excess fed back to grid)**

Other Forms:

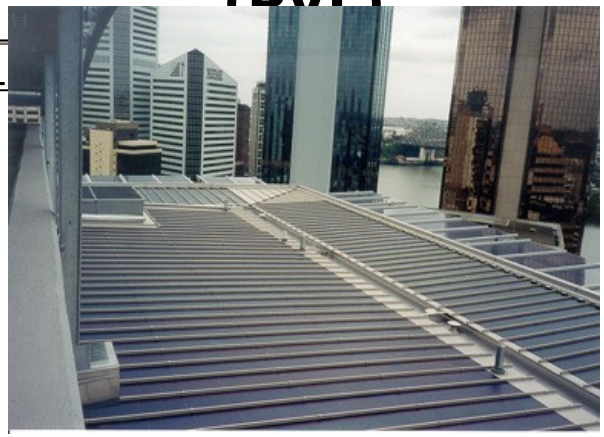
- **Roof shingles**
- **Metal roof panels (building-integrated)**
- **Coatings**

Rapidly expanding global market!!

Worldwide production 6.5MW in 1980, 126.7MW in 1997

Photovoltaics

Field Applied Roofing Laminate (PVL)



Brisbane, Australia
30 kW of UNI-SOLAR® PVL bonded on BHP Color Bond

Standing Seam Metal Systems (SSR)

Santa Monica, CA, SolarPort generates 44,000kW/hours of electricity from the sun each year

Standard Rigid Module With Durable Frame

Roehamption-Vale, United Kingdom
10.5 kW system using rack-mounted US-64s

Wind Power

- Home-sized: rotors 8 to 25 ft dia, ~ 30 ft tall
- Largest utility: rotors > 300 ft dia, > 200 ft tall

Drawbacks:

- Noise, aesthetics, bird kills
- Intermittent wind
- Good sites in remote locations
- Competition with other land uses

Courtesy NREL

Fastest growing electricity source in 1990s.

No

EA Credit 3: Enhanced Commissioning

Intent:

Begin the commissioning process early in the design process and execute additional activities after systems performance verification is completed.

Requirement:

Fundamental Commissioning requirements PLUS

CxA design review with backcheck

CxA contractor submittals review

Systems Manual

CxA 10-month post-occupancy building operation review, plan for corrections.

CxA MUST answer directly to Owner

Notes:

Only way DB can earn this credit is if Government provides CxA – separate USACE or Installation contract OR, per CIR 9/15/06, Contractor may hire but must be "disinterested 3rd Party" who answers directly to Government not through Contractor.

Post-occupancy activities –LEED score is not final at construction completion (contract closeout issue)

Design Phase through Post-Occupancy – cannot add to

May

EA Credit 4: Enhanced Refrigerant Management

Intent:

Reduce ozone depletion and support early compliance with the Montreal Protocol while minimizing direct contributions to global warming.

Requirement:

Option 1 – Do not use refrigerants.

OR

Option 2 – Select refrigerants and HVAC&R so that

LCGWP + LCODP x 10 to the 5th power does not exceed 100

LCGWP = Lifecycle Direct Global Warming Potential (lbCO2/Ton-Year)

LCODP = Lifecycle Ozone Depletion Potential (lbCFC11/Ton-Year)

AND

No halon, CFC or HCFC fire suppression systems

Notes:

New refrigerants & equipment – often included in tech proposals

Units using less than 0.5lbs refrigerant are not included

No

EA Credit 5: Measurement and Verification

Intent:

Provide for the ongoing accountability of building energy consumption over time.

Requirement:

Develop and implement Measurement & Verification Plan

M&V period no less than one year post-occupancy

Notes:

MT Default (Appendix L) is assume NO post-occupancy activities by Government – revise if not so. ALWAYS confirm this understanding when evaluating technical proposals.

Coordinate with Installation on EMCS capability for post-occupancy implementation.

No

EA Credit 6: Green Power

Intent:

Encourage the development and use of grid-source renewable energy technologies on a net zero pollution basis.

Requirement:

Provide at least 35% of the building's electricity from renewable sources by engaging in at least a two-year renewable energy contract.

Notes:

Requires a green power contract – Installation action.

Coordinate with Installation on applicability

Energy Resources

- CREST Center for Renewable energy & sustainable Technology, Renewable Energy Policy Project - http://solstice.crest.org/index.html
- DOE Smart Communities Network - http://www.sustainable.doe.gov
- DOE EERE (Energy Efficiency & Renewable Energy) Information Center - http://www.eren.doe.gov
- Environmental Building News - http://www.ebuild.com
- Rocky Mountain Institute - http://www.rmi.org
- U. S. Army Engineering Research & Development Center, Construction Engineering Research Laboratory - http://www.cecer.army.mil
- DOE Lawrence Berkeley National Laboratory: The Home Energy Saver - http://hes.lbl.gov/
- National Renewable Energy Laboratory (NREL) - http://www.nrel.gov/
- Sustainable Buildings Industry Council (SBIC): Energy 10 - http://www.sbicouncil.org/
- EPA EnergyStar- http://www.energystar.gov
- NIST Building and Fire Research Laboratory, Moist 3.0 - http://www.bfrl.nist.gov/863/moist.html
- DOE Lawrence Berkeley National Laboratory: Daylighting http://windows.lbl.gov/daylighting/Default.htm
- Green-E Renewable Electricity Certification Program - http://www.green-e.org

Materials and Resources (MR)

This category covers selection of materials and activities that reduce the waste stream, conserve virgin materials and minimize negative environmental effects of materials extraction, manufacture and transport.

1 prerequisite, 13 possible points

All Materials credits except building reuse and construction waste diversion:

- *Calculations are based on cost of division 2-10 materials ONLY (excludes plumbing, mechanical, electrical).*
- *Can include furniture, but if so, must include for ALL MR credits.*
- *All of these credits must use the same project materials total.*
- *LEED allows use of a default materials cost of 45% of project cost*

Yes

MR Prerequisite 1: Storage & Collection of Recyclables

Requirement:

Provide an easily accessible area that serves the entire building and is dedicated to the collection and storage of non-hazardous materials for recycling, including at a minimum:

paper, corrugated cardboard, glass, plastics and metals

Notes:

No minimum size room required – must be suitable (suggested sizes in LEED Reference Guide).

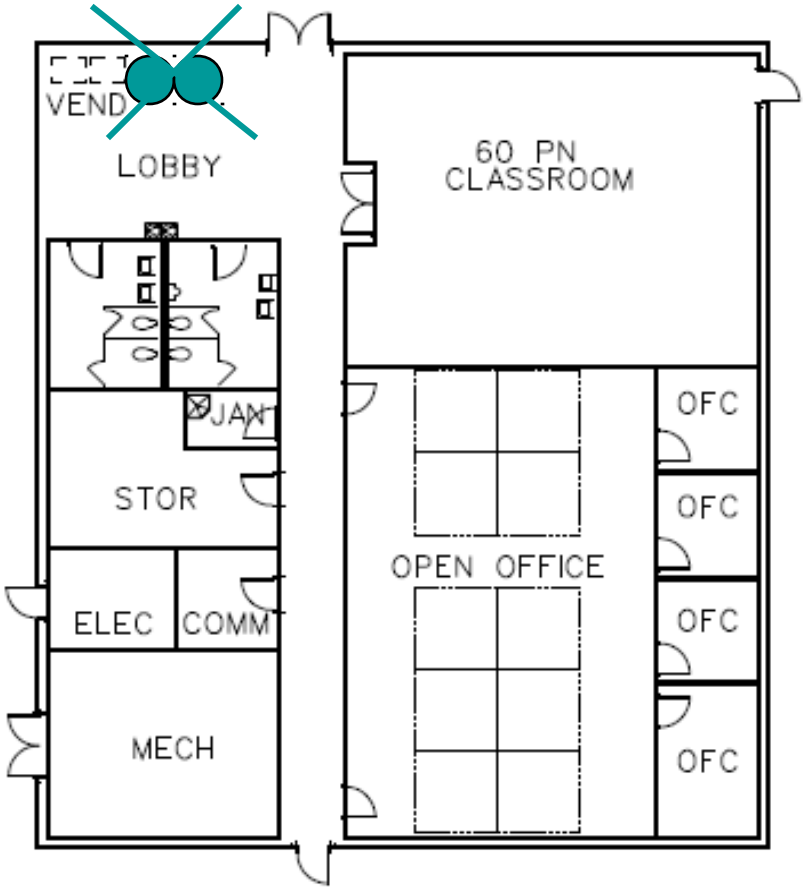
Receptacles in corridors only are not acceptable (corrugated cardboard)

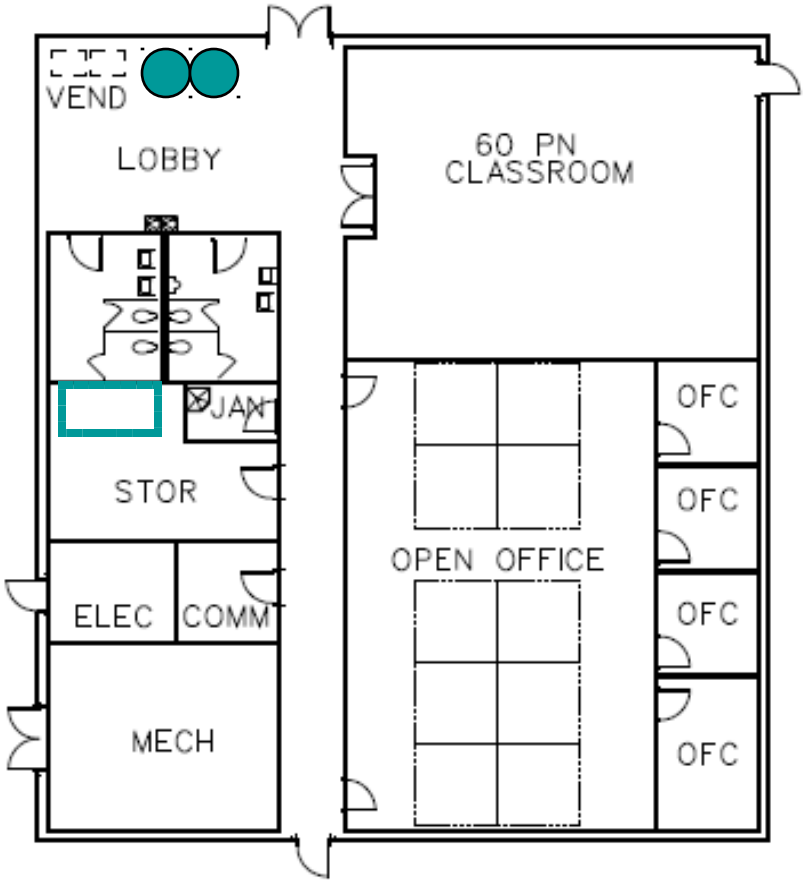
Does not always have to be in the building, can be shared in a complex – can be area at dumpster enclosure for recycling receptacles if functionally appropriate (barracks).

Does not always have to be a separate room (designated area at loading dock/warehouse).

Need to determine if solution is appropriate for building to meet intent

MRPR1: Storage & Collection of Recyclables





No

MR Credits 1.1, 1.2, 1.3: Building Reuse

Requirement:

Credit MR1.1 – Maintain 75% of Existing Walls, Floors and Roof

- Includes structural floor and roof deck, exterior skin and wall structure
- Excludes doors/windows and roof covering

Credit MR1.2 – Maintain 95% of Existing Walls, Floors and Roof

- Same as 1.1 but take BOTH points if 95%.

Credit MR1.3 – Maintain 50% of Interior Non-structural Elements

- Includes partitions, doors, floor coverings, ceilings

Notes:

Percentage of surface area

Renovation and Add/Alt Projects only

If add/alt, CANNOT take these credits if addition area is more than 2x existing building area.

If can’t earn this credit, can count reused elements as diverted waste under MR 2

MR1.1, 1.2, 1.3: Building Reuse

Adaptive reuse of historic structures at Ft. Riley, Kansas

Yes

MR Credits 2.1 & 2.2: Construction Waste Management

Requirement:

Credit MR2.1 – Recycle or divert at least 50% of non-hazardous construction and demolition debris. Develop and implement construction waste management plan.

Credit MR2.2 – Same as 2.1 but take BOTH points if 75%.

Notes:

Army mandates 50% diversion ALL PROJECTS.

LEED allows calculation by weight or volume, Army needs it in weight for it's reporting requirement (in MT wizard).

Army (SWAR) and Air Force need quarterly and final reports with tickets (in MT wizard). Obtain from contractor, forward to installation coordinator.

Waste mgt plan requirements are in MT Environmental Protection Plan spec.

CANNOT include excavated soil and land-clearing debris (vegetation, rocks).

MUST be generated on-site (no source reduction).

CAN include charities, salvagers, recyclers, deconstruction, reuse of materials on-site (rubble, asphalt).

Renovations that don't qualify for MR1 can count reused materials in this credit (not both credits).

Exclude hazardous materials from calculation.

Multiple contractors (COS) - Must combine data from all contractors to determine project total (construction administration).

No

MR Credits 3.1 & 3.2: Materials Reuse

Requirement:

Credit MR3.1 – Use salvaged, refurbished or reused materials so that the sum of these materials constitutes at least 5%, based on cost, of the total value of materials on the project.

Credit MR3.2 – Same as 3.1 but take BOTH points if 10%.

Notes:

This is for incorporating salvage, refurbished materials in new work

- From somewhere else
- “Fixed components” from on-site only if used for a different purpose (use door for a countertop)
- “Finish materials” from on-site w/same use if refurbished (re-used refurbished door hardware)

Retained existing items in the project count under either MR1 Building Reuse or MR2 Waste Mgt (reusing existing on-site fencing in new on-site location is MR2).

Designer responsibility – identify sources and incorporate them into design.

Difficult on DB – quality control.

Yes

MR Credits 4.1 & 4.2: Recycled Content

Requirement

Credit MR4.1 – Use materials with recycled content so that the sum of post-consumer recycled content plus one-half of the pre-consumer content constitutes at least 10%, based on cost, of the total value of materials on the project.

Credit MR4.2 – Same as 3.1 but take BOTH points if 20%.

Notes:

This is for incorporating new materials with recycled content.

Pre-consumer = post-industrial (blast furnace slag)

Can be designer or contractor responsibility (UFGS 01 33 29).

Related to but IN ADDITION TO EPA CPG recycled content mandate requirements.

See LEED Reference Guide for composite/partial calculations.

Building materials heavy contribution to total - Multiple Contractor projects: determine suitable division of

Recycled Content: EPA Comprehensive Procurement Guidelines (CPG)

- Mandatory all federal agencies
- If EPA designates a product, we must buy it with their recommended recycled content unless we have justification for non-use
  - Technically unsuitable
  - Unavailability
  - Prohibitive cost
  - Prohibitive schedule impact
- Contributes to LEED recycled content, but must ALWAYS be done regardless of LEED
- UFGS 01 62 35 RECYCLED/RECOVERED MATERIALS – ALL PROJECTS (DB, DBB versions)
- Example designated products: concrete, rigid and batt insulation, metal roofing

MR Credits 4.1 & 4.2: Recycled Content

Choose actual or default materials cost

SELECT OPTION

Please select the appropriate option to determine the Total Materials Cost

(•) **Default Materials Value:** Based on the total construction costs (hard costs for CSI Master Format 1995 Divisions 2-10 only)

( ) **Actual Materials Value:** Based on actual materials cost (hard costs for CSI Master Format 1995 Divisions 2-10 only)

DEFAULT MATERIALS VALUE

Enter the total construction costs (hard costs for CSI Master Format 1995 Divisions 2-10 only)*	$795,000.00
Default materials cost (total construction cost x 0.45)	**$357,750.00**

SAMPLE FORM SAMPLE FORM SAMPLE FORM

MR Credits 4.1 & 4.2: Recycled Content

- Input materials data
- Start with steel & concrete
- EPA designated items
- Watch % change as items are added, revised (bottom of form)

SAMPLE FORM

Material Name	Manufacturer	Material Cost* ($)	Post-Consumer Recycled Content (%)	Pre-Consumer Recycled Content (%)	Recycled Content Information Source	
Concrete with fly ash		$18,500.00		25.00		CLEAR
Steel Building Frame		$10,000.00	95.00			CLEAR
Light gage steel deck		$9,600.00	35.00			CLEAR
Reinforcing steel		$2,000.00	95.00			CLEAR
Metal Roofing		$24,000.00	35.00			CLEAR
Steel stud walls		$2,300.00	35.00			CLEAR
Metal toilet partitions		$2,000.00	35.00			CLEAR
Rigid Insulation		$18,000.00	9.00			CLEAR
Batt Insulation		$1,800.00	25.00			CLEAR
Ceiling suspension system		$3,700.00	35.00			CLEAR
Carpet		$3,500.00	10.00			CLEAR
Metal siding		$3,600.00	35.00			CLEAR
Split face CMU veneer		$3,300.00	10.00			CLEAR
Alum door & window frames		$3,000.00	80.00			CLEAR
Acoustic Tile ceiling		$5,500.00	25.00			CLEAR

MR Credits 4.1 & 4.2: Recycled Content

Our project:

Pre-engineered steel frame on slab
Steel stud walls
Metal deck, Metal roof
Rigid insulation walls & roof
Steel siding, split-face CMU base
Batt insulation exterior walls & acoustic
Carpet, ceiling tile
Aluminum windows & storefront

Recycled Content Calculations

SAMPLE FORM

Total value ($) of post-consumer content	$33,745.00
Total value ($) of pre-consumer content	$4,625.00
Total combined recycled content value ($): post-consumer + 1/2 pre-consumer	$36,057.50
Combined Recycled Content Value as a percentage of Total Materials Cost**	**10.079** %

SAMPLE FORM

***To qualify for the credit the percentage of recycled content (post-consumer + 1/2 pre-consumer must be at least 10% of the total materials cost*

Yes

MR Credits 5.1 & 5.2: Regional Materials

Intent:

Increase demand for building products that are extracted and manufactured within the region, thereby supporting the use of indigenous resources and reducing the environmental impacts resulting from transportation.

Requirement:

Credit MR5.1 – Use building materials or products that have been extracted, harvested or recovered, as well as manufactured, within 500 miles of the projects site for a minimum of 10%, based on cost, of the total value of materials on the project.

Credit MR5.2 – Same as 3.1 but take BOTH points if 20%.

Notes:

ALWAYS contractor responsibility (01 33 29).

See LEED Reference Guide for composite/partial calculations.

Site materials heavy contribution to total - Multiple Contractor projects: determine suitable division of percentage between contractors, must combine data

No

MR Credit 6: Rapidly Renewable Materials

Requirement:

Use rapidly renewable building materials and products (made from plants that are typically harvested within a ten-year cycle or shorter) so that the sum of these materials constitutes at least 2.5%, based on cost, of the total value of materials on the project.

Notes:

ALWAYS Designer responsibility – identify materials and incorporate them into design.

Examples: bamboo, linoleum, cork, wheatboard, strawboard, cotton or soy

MR Credit 6: Rapidly Renewable Materials – Workshop Building

Estimated Contract Cost $795,000
LEED default option Materials Cost 45%: $357,750
Rapidly Renewable Materials Cost 2.5%: Minimum $8944

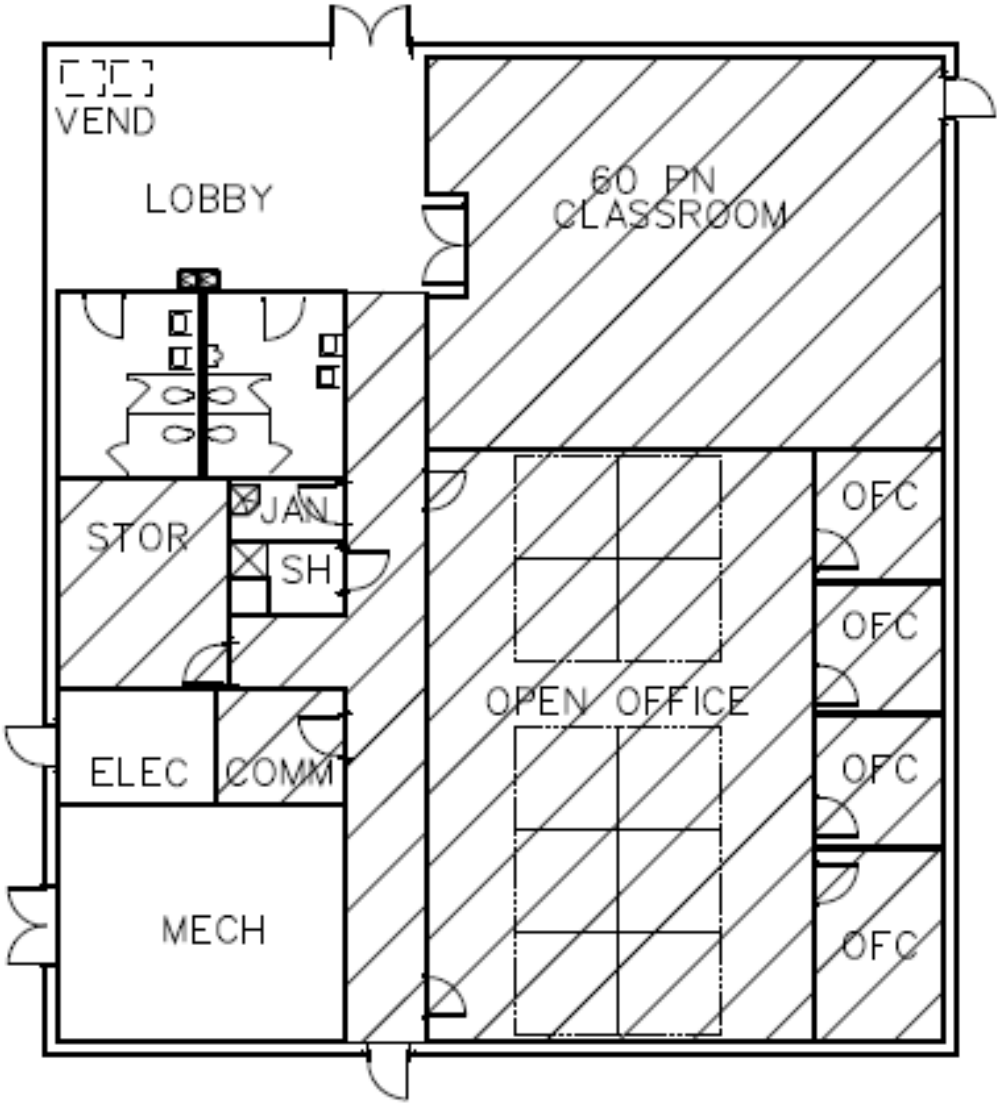
VCT (1/8”):
$1.50/sf mat, $1.00/sf inst, $2.50/sf total
Carpet (32 oz nylon):
$1.10/sf mat, $.35/sf inst, $1.45/sf total
Linoleum (rapidly renewable):
$2.50/sf mat, $5.00/sf inst, $7.50/sf total

To achieve minimum $8944 rapidly renewable materials cost using linoleum, need to use 3600sf of it.

Delta $5.00/sf installed cost x 3600sf = adds $18,000 total cost to project

MR Credit 6: Rapidly Renewable Materials

3678sf linoleum



May

MR Credit 7: Certified Wood

Intent:

Encourage environmentally responsible forest management.

Requirement:

Use a minimum of 50% of wood-based materials and products, which are certified in accordance with the Forest Stewardship Council's (FSC) Principles and Criteria, for wood building components.

Notes:

50% of the permanent wood in the building FSC Certified.

Includes (but not limited to) framing, subfloor, finish floor, doors, casework, finishes/trim.

Permanently incorporated items only (formwork n/a).

Can be designer or contractor responsibility (01 33 29).

Cost premium, availability varies by region – easier on jobs with little wood.

See LEED Reference Guide for composite/partial

Indoor Environmental Quality

This category covers productivity, comfort and well-being of building occupants.

2 prerequisites, 15 possible points

- *Indoor Air Quality*
  - *Outdoor air & ventilation*
  - *Contaminants in HVAC systems*
- *Low-emitting (low VOC) interior materials*
- *Thermal comfort and occupant control*
- *Lighting occupant control*
- *Occupant access to daylight and views*

Yes

EQ Prerequisite 1: Minimum IAQ Performance

Intent:

Establish minimum indoor air quality (IAQ) performance to enhance IAQ in buildings, thus contributing to the comfort and well-being of the occupants.

Requirement:

Meet the requirements of Sections 4 through 7 of ASHRAE 62.1-2004 Ventilation for Acceptable Indoor Air Quality. Mechanical systems shall be designed using the Ventilation Rate Procedure or the applicable local code, whichever is more stringent.

Notes:

As a LEED prerequisite, required on all projects

Yes

EQ Prerequisite 2: Environmental Tobacco Smoke (ETS) Control

Intent:

Minimize exposure of building occupants, indoor surfaces and ventilation air distribution systems to Environmental Tobacco Smoke (ETS).

Requirement:

Option 1 – Prohibit smoking in building. Locate any exterior designated smoking areas at least 25 feet from entries, outdoor air intakes and operable windows.

(Option 2 – designated smoking areas inside building not applicable)

Option 3 – Residential buildings only:

- **Prohibit smoking in common areas of building.**
- **Locate any exterior designated smoking areas at least 25 feet from entries, outdoor air intakes and common area operable windows.**
- **At each dwelling unit seal wall, chase, ceiling and floor penetrations.**
- **Weatherstrip doors from dwelling units to common hallway except where hallway has positive pressure differential average 5Pa, minimum 1Pa.**
- **Demonstrate dwelling unit sealing with blower door tests**

May

EQ Credit 1: Outdoor Air Delivery Monitoring

Requirement:

Install permanent monitoring systems that provide feedback on ventilation system performance. Equipment must generate an alarm when conditions vary more than 10% from setpoint (either through building automation system or audible alarm).

Mechanically Ventilated Spaces –

- Provide CO2 monitoring at all spaces with occupant density at least 25 occupants/1000 sf. Locate between 3 and 6 feet above floor.
- For each mechanical ventilation system serving lesser density spaces provide a direct outdoor airflow measurement device with 15% plus/minus accuracy from design minimum airflow rate.

Naturally Ventilated Spaces –

- Provide CO2 monitoring at all naturally ventilated spaces. Locate between 3 and 6 feet above floor.

Notes:

No

EQ Credit 2: Increased Ventilation

Intent:

Provide additional outdoor air ventilation to improve indoor air quality for improved occupant comfort, well-being and productivity.

Requirement:

Mechanically Ventilated Spaces –

- **Increase breathing zone outdoor air ventilation rates to all occupied spaces by at least 30% above the minimum rates required by ASHRAE 62.1-2004.**

Naturally Ventilated Spaces –

- **Design to meet the recommendations in the Carbon Trust Good Practice Guides 237.**

AND

- **Provide diagrams and calculations demonstrating system meets recommendations of CIBSE Applications Manual 10**

OR

- **Provide analytic room-by-room airflow model demonstrating 90% of occupied spaces meet ASHRAE 62.1 minimum airflow rates.**

Notes:

In mechanically ventilated buildings CONFLICTS with mandatory energy reductions – clarify/confirm feasibility if included in

Yes

EQ Credit 3.1: Construction IAQ Management Plan – During Construction

Intent:

Reduce IAQ problems resulting from the construction/renovation process in order to help sustain the comfort and well-being of construction workers and building occupants.

Requirement:

Develop and implement an IAQ management Plan for construction and pre-occupancy that includes:

- **During construction meet or exceed recommended measures of SMACNA IAQ Guidelines for Occupied Buildings Under Construction, 1995, chapter 3.**
- **Protect stored on-site or installed absorptive materials from moisture damage.**
- **If permanently installed air handlers are used during construction, use filtration media with MERV 8 at each return grille and replace all filters immediately prior to occupancy.**

Notes:

Must follow above SMACNA Guidelines even though building is unoccupied while under construction.

Yes

EQ Credit 3.2: Construction IAQ Management Plan – Before Occupancy

Requirement:

Develop and implement an IAQ management Plan for pre-occupancy that includes:

Option 1 – Flush-out

- After construction ends and all interior finishes are installed and prior to occupancy, perform building flush-out by supplying total air volume of 14,000cf outdoor air per sf floor area, maintaining minimum 60 degrees temperature and maximum 60% relative humidity.

  OR

- Optional flush-out sequence for occupancy during flush-out.

OR

Option 2 – Air Quality Testing

Conduct baseline IAQ testing after construction ends and all interior finishes are installed and prior to occupancy, using protocols and meeting concentration limits in LEED Reference Guide. Flush-out and re-test if tests fail.

Notes:

Include in construction schedule

Can give contractor option of flush-out or testing.

Indoor Environmental Quality (EQ) Low-Emitting Materials Credits

Low-emitting materials credits include everything inside the exterior surface covering, including wall cavities, attics, above ceilings, ductwork. See LEED Reference Guide Supplemental Information section on these credits.

Yes

EQ Credit 4.1: Low-Emitting Materials – Adhesives & Sealants

Intent:

Reduce the quantity of indoor air contaminants that are odorous, irritating and/or harmful to the comfort and well-being of installers and occupants.

Requirement:

All adhesives and sealants used on the interior of the building (defined as inside of the weatherproofing system and applied on-site) shall comply with VOC limits of South Coast Air Quality Management District (SCAQMD) Rule 1168 (Green Seal Standard GS-36 for aerosol adhesives).

Notes:

Includes fire stopping, duct sealants, plumbing adhesives, construction adhesives as well as finish adhesives and sealants.

Field-applied only.

VOC budget Alternate Compliance Path available (individual

Yes

EQ Credit 4.2: Low-Emitting Materials – Paints & Coatings

Requirement:

All paints and coatings used on the interior of the building (defined as inside of the weatherproofing system and applied on-site) shall comply with comply with VOC limits of South Coast Air Quality Management District (SCAQMD) and Green Seal standards listed in LEED (by coating type).

Notes:

Field-applied only.

VOC budget Alternate Compliance Path available (individual noncompliant products with overall low VOC performance)

Yes

EQ Credit 4.3: Low-Emitting Materials – Carpet Systems

Requirement:

- All carpet installed in the building interior shall meet testing and product requirements of Carpet and Rug Institute's (CRI) Green Label Plus program.
- All carpet adhesive shall meet VOC requirements of EQ4.1.
- All carpet cushion shall meet requirements of CRI Green Label program.

Notes:

Certified under Green Label Plus program or independently tested in accordance with requirements.

Must be carpet in the facility!! (no minimum amount)

3/22/07 CIR: Alternate Compliance Path now available for all hard surface flooring Greenguard Certified or

Yes

EQ Credit 4.4: Low-Emitting Materials – Composite Wood & Agrifiber Products

Requirement:

- All composite wood and agrifiber products used on the interior of the building (defined as inside of the weatherproofing system and applied on-site) shall contain no added urea-formaldehyde resins.
- Laminating adhesives used to fabricate on-site and shop-applied composite wood and agrifiber assemblies shall contain no added urea-formaldehyde resins.
- Defined as: particleboard, MDF, plywood, wheatboard, strawboard, panel substrates and door cores.

Notes:

Furniture and equipment not included. Built-in casework is included.

Yes

EQ Credit 5: Indoor Chemical and Pollutant Source Control

Requirement:

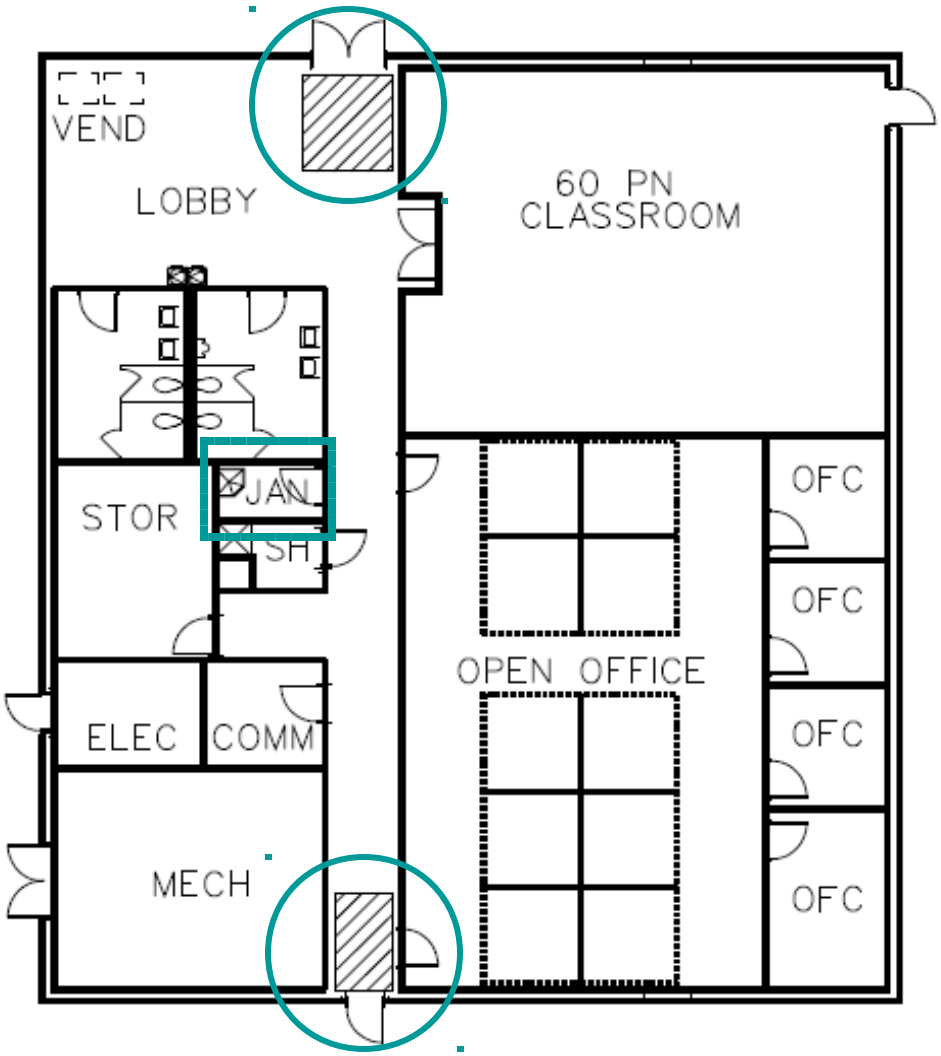
- Provide permanent entryway systems at least 6 feet long at all entryways that are directly connected to the outdoors (regular entry points for building occupants).
  - Acceptable systems are permanently installed grates, grilles or slotted systems that allow cleaning underneath.
  - Roll-out mats are acceptable only if maintained weekly by contracted service.
- Where hazardous gases or chemicals may be present or used (garages, housekeeping/laundry areas and copying/printing rooms):
  - Exhaust space to create negative pressure. Minimum 0.50 cfm/sf exhaust rate with no air re-circulation. Positive pressure differential average 5Pa, minimum 1Pa.
  - Provide closer on door
  - Provide hard ceiling or extend partitions to deck.
- In mechanically ventilated buildings, provide regularly occupied areas with MERV 13 filters immediately prior to occupancy (both return and outside supply air).

Notes:

MT Appendix L says assume no weekly service for roll up mats

Indoor Chemical and Pollutant Source Control

- Walk-off mats at regularly used occupant entries
- Seal/exhaust Janitor Closet? Depends on cleaning chemicals used (flooring materials)



No

EQ Credit 6.1: Controllability of Systems - Lighting

Intent:

Provide a high level of lighting system control by individual occupants or by specific groups in multi-occupant spaces to promote the productivity, comfort and well-being of building occupants.

Requirement:

Provide individual lighting controls for minimum 90% of the building occupants to enable adjustments to suit individual tasks and preferences.

AND

Provide lighting system controllability for all shared multi-occupant spaces (classrooms, conference rooms) to enable lighting adjustment that meets group needs and preferences.

Notes:

Individual task lighting in addition to ambient lighting for 90% of private offices and workstations.

Adjustability means, as a minimum, occupant on-off

No

EQ Credit 6.1: Controllability of Systems – Thermal Comfort

Requirement:

Provide individual comfort controls for minimum 50% of the building occupants to enable adjustments to suit individual tasks and preferences. Operable windows can be used for occupants 20 feet inside of and 10 feet either side of operable portion.

AND

Provide comfort system controls for all shared multi-occupant spaces (classrooms, conference rooms) to enable adjustments to suit group needs and preferences.

Notes:

Defined as control over at least one of the following: air temperature, radiant temperature, air speed and humidity.

Big open office needs underfloor system.

May

EQ Credit 7.1: Thermal Comfort - Design

Intent:

Provide a comfortable thermal environment that supports the productivity and well-being of building occupants.

Requirement:

Design HVAC and envelope to meet ASHRAE 55-2004, Thermal Comfort Conditions for Human Occupancy.

Notes:

Includes the following: air temperature, radiant temperature, air speed and

No

EQ Credit 7.2: Thermal Comfort - Verification

Intent:

Provide for the assessment of building thermal comfort over time.

Requirement:

Implement a thermal comfort survey of building occupants within a period of 6 to 18 months after occupancy.

Develop a corrective action plan if survey results indicate more than 20% of occupants are dissatisfied. Plan to include relevant environmental variables in ASHRAE 55-2004.

Notes:

This point CANNOT be earned unless EQ7.1 is earned (LEED Errata sheet).

MT Default (Appendix L) is assume NO post-occupancy activities by Government - revise if not so. ALWAYS

No

EQ Credit 8.1: Daylight and Views – Daylight 75% of Spaces

Requirement:

Option 1 – Glazing Factor Calculation. Achieve a minimum glazing factor of 2% in a minimum of 75% of regularly occupied areas.

OR

Option 2 – Daylight Simulation Model. Demonstrate through computer simulation that a minimum daylight illumination of 25fc has been achieved in 75% of regularly occupied areas.

OR

Option 3 – Daylight Measurement. Same as Option 2 but demonstrated through records of indoor light measurements (completed facility).

AND (ALL OPTIONS)

Provide glare control.

Notes:

Only the sf that meets the requirement counts (not whole rooms).

Regularly Occupied includes offices, meeting/classroom group areas. Does not include support spaces like copy, mechanical room, laundry, restrooms, corridors.

Very dependent on building layout.

Higher the glass the better.

EQ Credit 8.1: Daylight and Views – Daylight 75% of Spaces

LEED 2.2 Glazing Factor Tabulation Spreadsheet

Regularly Occupied Space ID	Regularly Occupied Space Name	Regularly Occupied Space Area (sf)	Sidelighting - Vision Glazing (area between 2'-6" & 7'-6")			Sidelighting - Daylight Glazing (area above 7'-6")			Toplighting - Sawtooth Monitor			Toplighting - Horizontal Skylight			Overall Glazing Factor
			Area (sf)	Tvis Actual	Glazing Factor	Area (sf)	Tvis Actual	Glazing Factor	Area (sf)	Tvis Actual	Glazing Factor	Area (sf)	Tvis Actual	Glazing Factor	
	Open Office	1380	80	0.9	1.04348	32	0.9	0.41739		0.4	0		0.4	0	1.46
	Private Office 1	100		0.9	0		0.9	0			0			0	0.00
	Private Office 2	100		0.9	0		0.9	0			0			0	0.00
	Private Office 3	100		0.9	0		0.9	0			0			0	0.00
	Private Office 4	100		0.9	0		0.9	0			0			0	0.00
	Private Office 5	150		0.9	0		0.9	0			0			0	0.00
	Classroom	1200		0.9	0		0.9	0			0			0	0.00
					-			-			-			-	0.00
					-			-			-			-	0.00
					-			-			-			-	0.00
					-			-			-			-	0.00
					-			-			-			-	0.00
					-			-			-			-	0.00

Total Regularly Occupied Space Area (sf)	Total Regularly Occupied Space Area w/ a Minimum 2% Glazing Factor	Percentage of Total Regularly Occupied Space w/ 2% Glazing
3130	0	0%

Fill in all regularly occupied spaces and area for each

Open Office: try 4EA windows 4’wide, 7’high, sill 2’6” AFF (4x5=20sf below 7’-6”, 4x2=8sf above 7’6”) NEED 10’ CLG HT

Glazing factor tabulation spreadsheet available at http://en.sas.usace.army.mil (same as LEED Letter Template)

EQ Credit 8.1: Daylight and Views – Daylight 75% of Spaces

LEED 2.2 Glazing Factor Tabulation Spreadsheet

Regularly Occupied Space ID	Regularly Occupied Space Name	Regularly Occupied Space Area (sf)	Sidelighting - Vision Glazing (area between 2'-6" & 7'-6")			Sidelighting - Daylight Glazing (area above 7'-6")			Toplighting - Sawtooth Monitor			Toplighting - Horizontal Skylight			Overall Glazing Factor
			Area (sf)	Tvis Actual	Glazing Factor	Area (sf)	Tvis Actual	Glazing Factor	Area (sf)	Tvis Actual	Glazing Factor	Area (sf)	Tvis Actual	Glazing Factor	
	Open Office	1380	80	0.9	1.04348	32	0.9	0.41739		0.4	0	16	0.4	0.5797	2.04
	Private Office 1	100		0.9	0		0.9	0			0			0	0.00
	Private Office 2	100		0.9	0		0.9	0			0			0	0.00
	Private Office 3	100		0.9	0		0.9	0			0			0	0.00
	Private Office 4	100		0.9	0		0.9	0			0			0	0.00
	Private Office 5	150		0.9	0		0.9	0			0			0	0.00
	Classroom	1200		0.9	0		0.9	0			0			0	0.00
					-			-			-			-	0.00
					-			-			-			-	0.00
					-			-			-			-	0.00
					-			-			-			-	0.00
					-			-			-			-	0.00
					-			-			-			-	0.00

Total Regularly Occupied Space Area (sf)	Total Regularly Occupied Space Area w/ a Minimum 2% Glazing Factor	Percentage of Total Regularly Occupied Space w/ 2% Glazing
3130	1380	44%

- Add 2EA 2’x4’ skylights
- Open Office plus all private offices < 75% of occupied area – must address classroom

EQ Credit 8.1: Daylight and Views – Daylight 75% of Spaces

LEED 2.2 Glazing Factor Tabulation Spreadsheet

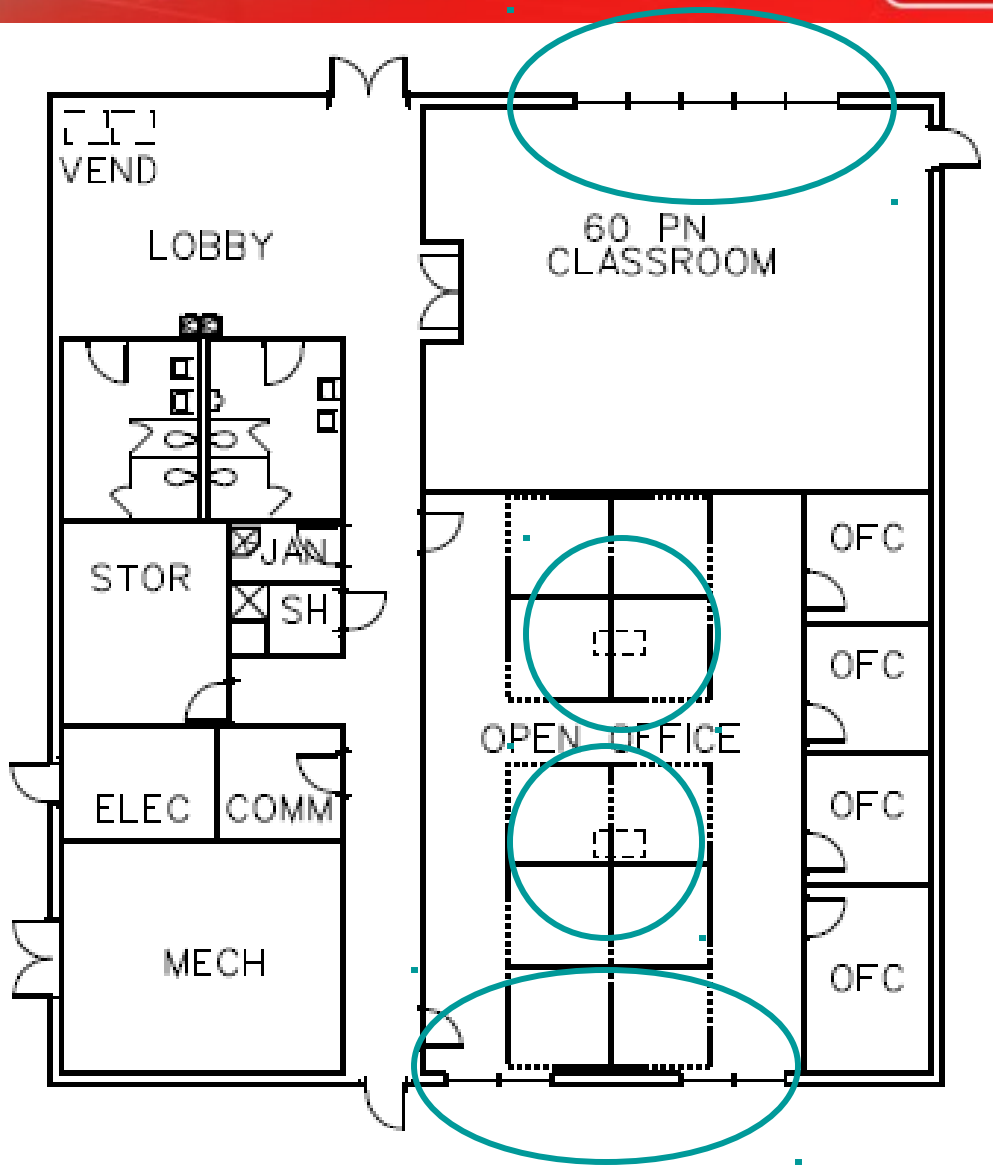
Regularly Occupied Space ID	Regularly Occupied Space Name	Regularly Occupied Space Area (sf)	Sidelighting - Vision Glazing (area between 2'-6" & 7'-6")			Sidelighting - Daylight Glazing (area above 7'-6")			Toplighting - Sawtooth Monitor			Toplighting - Horizontal Skylight			Overall Glazing Factor
			Area (sf)	Tvis Actual	Glazing Factor	Area (sf)	Tvis Actual	Glazing Factor	Area (sf)	Tvis Actual	Glazing Factor	Area (sf)	Tvis Actual	Glazing Factor	
	Open Office	1380	80	0.9	1.04348	32	0.9	0.41739		0.4	0	16	0.4	0.5797	2.04
	Private Office 1	100		0.9	0		0.9	0			0			0	0.00
	Private Office 2	100		0.9	0		0.9	0			0			0	0.00
	Private Office 3	100		0.9	0		0.9	0			0			0	0.00
	Private Office 4	100		0.9	0		0.9	0			0			0	0.00
	Private Office 5	150		0.9	0		0.9	0			0			0	0.00
	Classroom	1200	100	0.9	1.5	40	0.9	0.6			0			0	2.10
					-			-			-			-	0.00
					-			-			-			-	0.00
					-			-			-			-	0.00
					-			-			-			-	0.00
					-			-			-			-	0.00
					-			-			-			-	0.00

Total Regularly Occupied Space Area (sf)	Total Regularly Occupied Space Area w/ a Minimum 2% Glazing Factor	Percentage of Total Regularly Occupied Space w/ 2% Glazing
3130	2580	82%

- Don't want skylights in Classroom (A/V)
- Classroom: try 5EA windows 4'wide, 7'high, sill 2'6" AFF (4x5=20sf below 7'-6", 4x2=8sf above 7'6")

EQ Credit 8.1: Daylight and Views – Daylight 75% of Spaces

- Windows at Classroom
- Windows & skylights at Open Office
- Can add windows at private offices but not required for this credit
- Ceiling height is important



May

EQ Credit 8.1: Daylight and Views – Views for 90% of Spaces

Requirement:

Achieve direct line-of sight to the outdoors via vision glazing between 2’-6” and 7’-6” above finish floor for building occupants in 90% of all regularly occupied areas.

Notes:

Diagram line-of-sight view areas for all regularly occupied spaces on floor plan. Line of site is from 42” AFF.

Can include interior glazing.

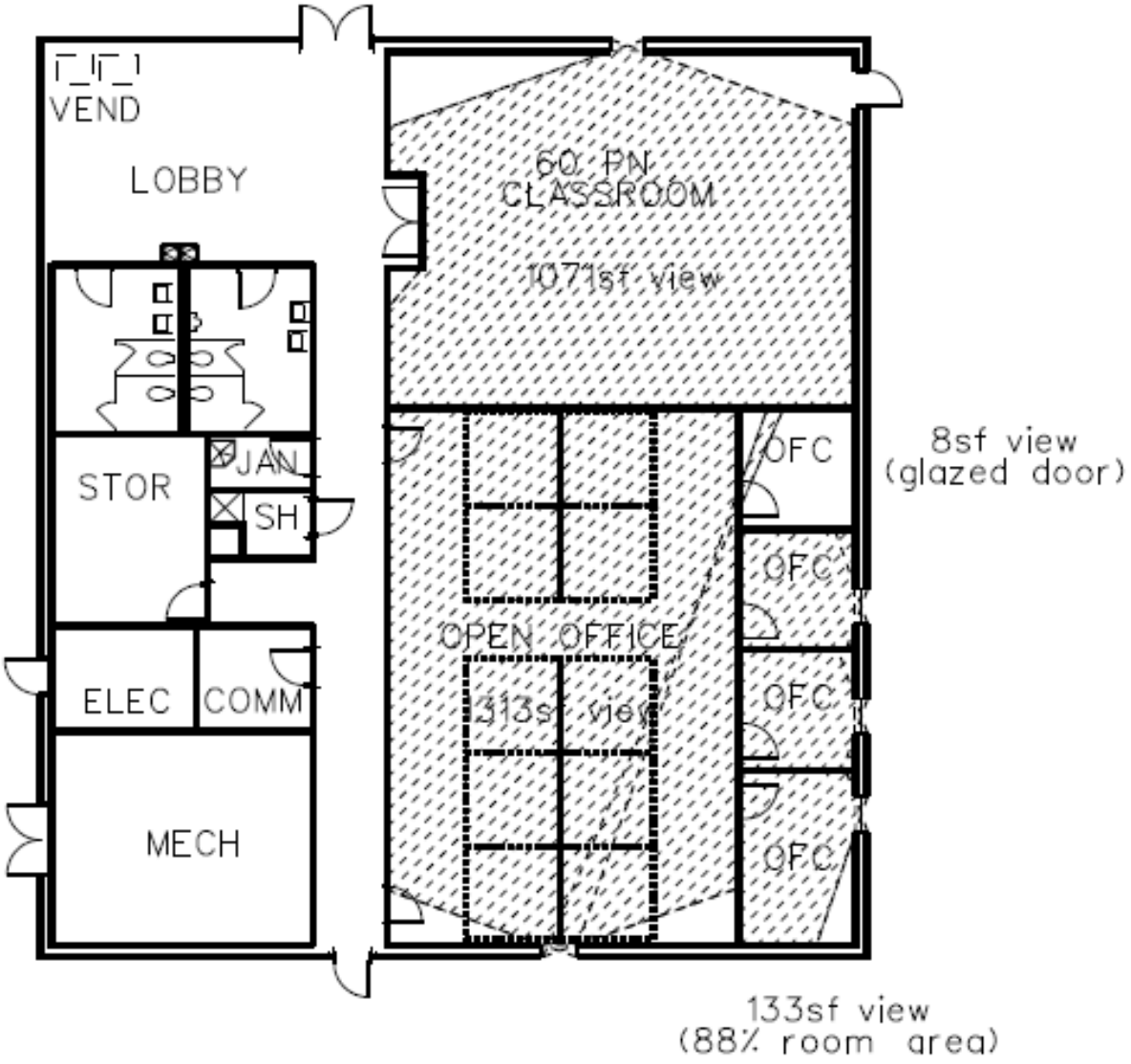
For private offices can count whole room area if 75% of room is within view area as diagrammed. For multi-occupant spaces only the sf that meets the requirement counts (not whole rooms).

Regularly Occupied includes offices, meeting/classroom group areas. Does not include support spaces like copy, mechanical room, laundry, restrooms, corridors.

EQ Credit 8.1: Daylight and Views – Views for 90% of Spaces

Diagram Views:

- **Shared spaces – count only actual view area**
- **Private offices – count actual view area except count whole room area if view area is greater than 75% of room area**
- **Include diagramming plan in contract docs "for reference only"**



EQ Credit 8.1: Daylight and Views – Views for 90% of Spaces

LEED 2.2 Glazing Factor Tabulation Spreadsheet																VIEWS
			Sidelighting - Vision Glazing (area between 2'-6" & 7'-6")			Sidelighting - Daylight Glazing (area above 7'-6")			Toplighting - Sawtooth Monitor			Toplighting - Horizontal Skylight				
Regularly Occupied Space ID	Regularly Occupied Space Name	Regularly Occupied Space Area (sf)	Area (sf)	Tvis Actual	Glazing Factor	Area (sf)	Tvis Actual	Glazing Factor	Area (sf)	Tvis Actual	Glazing Factor	Area (sf)	Tvis Actual	Glazing Factor	Overall Glazing Factor	Portion of Space with Access to Views (sf)
	Open Office	1380	20	0.9	0.26087	8	0.9	0.10435		0.4	0		0.4	0	0.37	1313
	Private Office 1	100		0.9	0		0.9	0			0			0	0.00	8
	Private Office 2	100		0.9	0		0.9	0			0			0	0.00	100
	Private Office 3	100		0.9	0		0.9	0			0			0	0.00	100
	Private Office 4	100		0.9	0		0.9	0			0			0	0.00	100
	Private Office 5	150		0.9	0		0.9	0			0			0	0.00	150
	Classroom	1200	20	0.9	0.3	8	0.9	0.12			0			0	0.42	1071
					-			-			-			-	0.00	
					-			-			-			-	0.00	
					-			-			-			-	0.00	
					-			-			-			-	0.00	
					-			-			-			-	0.00	
					-			-			-			-	0.00	

Total Regularly Occupied Space Area (sf)	Total Regularly Occupied Space Area w/ a Minimum 2% Glazing Factor	Percentage of Total Regularly Occupied Space w/ 2% Glazing (75% required)	Total Regularly Occupied Space Area w/Access to Views	Percentage of Total Regularly Occupied Space w/Access to Views (90% required)
3130	0	0%	2842	91%

EQ Credit 8.1: Daylight and Views – Views for 90% of Spaces

- Consider early in the design process.
- Highly dependent on building layout.
- For daylighting the higher the glazing the better (ceiling heights).
- MUST collaborate with mech & elec on glazing decisions (envelope, lighting controls)

Innovation & Design Process (ID)

This category covers exemplary performance in an established LEED credit and/or innovative performance in green building categories not addressed in LEED, and LEED Accredited Professional (LEED AP) team member.

5 possible points

This is where you can create your own LEED credits (up to 4).

Yes

ID Credits 1.1 – 1.4: Innovation in Design

Requirement:

Up to 4 available.

Exemplary Performance in an existing credit –

- **LEED Reference Guide states availability to credit and requirements for exemplary performance ID credit for each credit (example waste diversion achieve 95%).**
- **GREATLY EXCEED - Generally, double the credit requirement or next increment of achievement.**

Innovations not addressed in LEED –

- **Comprehensive approach, significant, measurable environmental benefits**
  - **Demonstrate quantitative performance improvements for environmental benefit over defined baseline.**
  - **Must be comprehensive**
  - **Formula applicable to other projects**

Notes:

Find existing approved ID credits at USGBC catalog of potential Innovation in Design credits at: http://www.usgbc.org/ShowFile.aspx?DocumentID=3569

Technical evaluations: get clarification if ID credit is taken but not named or described.

Yes

ID Credit 2: LEED Accredited Professional

Intent:

To support and encourage the design integration required by a LEED-NC green building project and to streamline the application and certification process.

Requirement:

At least one principal participant of the project team shall be a LEED Accredited Professional (AP).

Notes:

USACE requires a LEED AP on all design and construction teams. *BECOME ONE!!!*

After transition to new credentialing system 2009, Legacy AP will NOT qualify for this credit.

LEED 2009 – What's Different, What Stays the Same

Changes:

Total number of possible points goes from 69 to 100

Point value of individual credits will be re-weighted

Matching of similar credits among the various LEED rating tools

Regionally preferred credits will earn extra points in that region (ID credits)

Still the Same:

4 achievement levels (number of points required for each will change)

Letter Templates, registration, certification processes the same (revised Templates for LEED 2009)

Notes:

Projects registered under Version 2.2 will stay with 2.2.

Eventually USGBC will no longer accept 2.2 registrations

Future: Projects may combine credits from all rating tools

Army will evaluate and issue guidance

Questions, Feedback

- Sustainable Sites
- Water Efficiency
- Energy and Atmosphere
- Materials and Resources
- Indoor Environmental Quality
- Innovation & Design Process
- LEED 2009